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BLUE JAY

Volume 62 Number 2 June 2004

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COVERS: **Front** - Long-tailed Weasel with unusual facial mask, photographed near Saskatoon by Claire Jardine.
Back - *Somatochlora Williamsoni*, Williamson's Emerald, photographed by S. W. Dunkle

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BIRDS

RODDICK LAKE BIRDS, 76 YEARS AFTER MITCHELL AND BARD

MYRON BARTON, Box 7, MacDowall, SK S0K 2S0 E-mail: myron@inet2000.ca

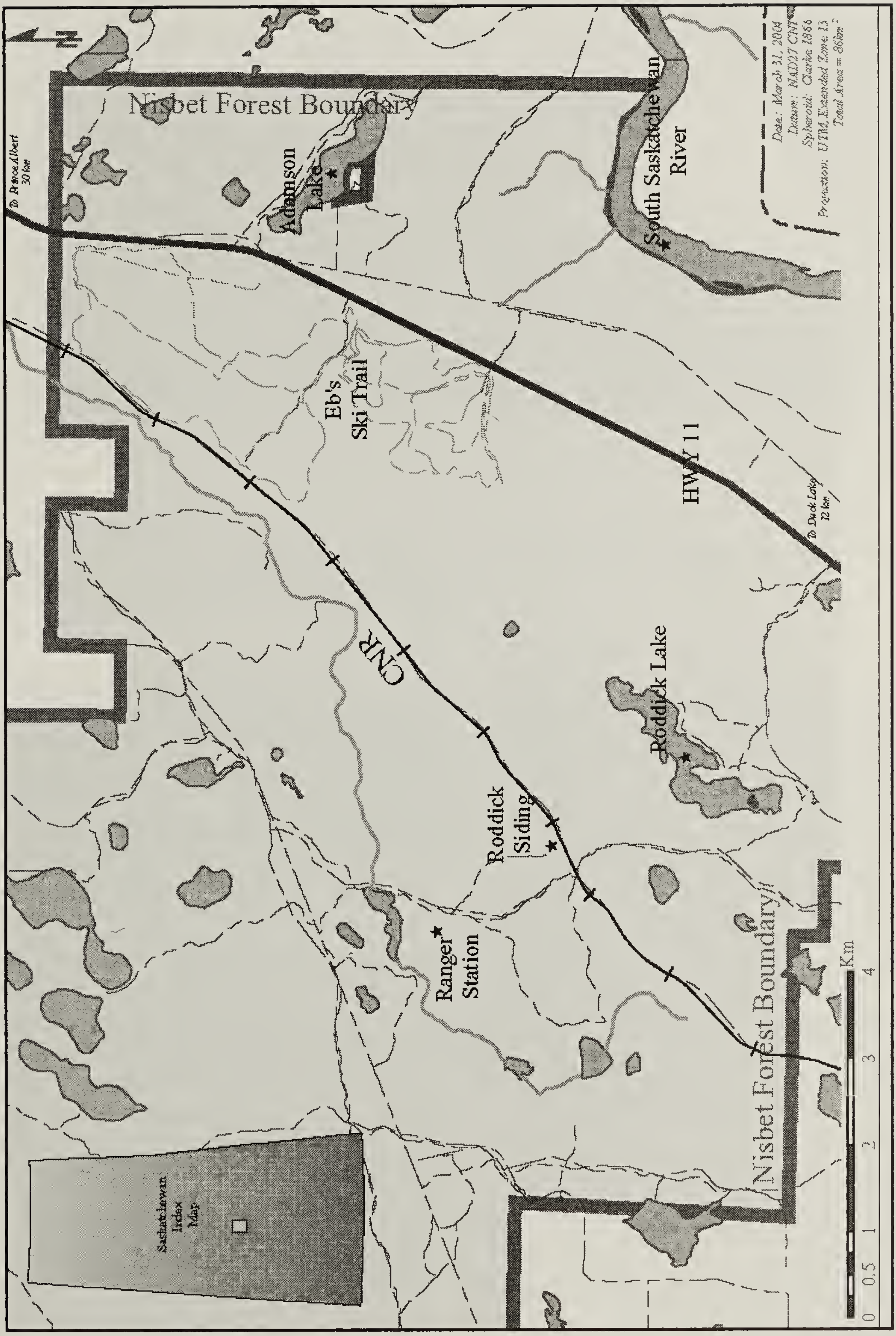
"Traveling northward from Regina, over the bare prairie, one comes to the first evergreen or coniferous trees, near Roddick, in the Pines [Nisbet] Forest Reserve, some 25 miles south of the City of Prince Albert. Not far from the small railway station is the forest ranger's house and lofty look-out tower. From the latter the naturalist gets a fine view over his chosen collecting ground; a 'rolling' country, with many lakes and muskegs among the jackpine and spruce trees. Here on May 21st [1927], assistant biologist, F. Bard and I pitched our camp on the shore of Birch [Roddick] Lake, well sheltered from storms by poplar, birch and spruce trees.

"In that forested country waterfowl are not, of course, as plentiful as on the prairie lakes and sloughs to the south, but ring-necked ducks, lesser scaups, mallards, white winged scoters and some other common ducks were noted, evidently nesting in the marshy bays around the lake. Woodland birds, as expected, were found in greater numbers and variety; the phoebe, so well-known in eastern Canada, was surprisingly common, at least eight pairs of these small flycatchers were noted nesting in the district; a nest, eggs and specimens of this species collected were much needed acquisitions for the museum, as was also a yellow-bellied flycatcher taken on May 30th. Other important finds were a set of four eggs of the sharp-shinned hawk–laid in an old nest of a crow's–a set of [five] eggs of palm warbler, a male Philadelphia vireo [May 30], besides other specimens, listed elsewhere, as acquisitions to the museum, including material for three small bird-groups. ... During our stay of a month in that district a lot of rainy days were experienced, as usual in the wooded areas at that time of the year, but we secured over 100 insect specimens, mainly butterflies, several of which were new to the collections already in the museum."[2]

The foregoing is quoted from H.H. Mitchell's report covering the Saskatchewan Museum 1927 collecting expedition. Mitchell was at the time the provincial naturalist and Fred Bard was the assistant biologist. They spent May 21 to June 22 observing and collecting specimens for the provincial museum.

Stuart Houston had access to the field notes of Mitchell and Bard at Roddick Lake in 1927 and cited them for each of 97 species in his 1959 publication.[1] (A recent search in his files and a search by the staff at the Royal Saskatchewan Museum has failed to relocate them). According to Stuart, with only a few exceptions, Mitchell and Bard provided little information regarding abundance, or evidence of breeding.

I thought it might be of interest, and of some scientific value, after a lapse of 76 years, to revisit the site at the same time of year that Mitchell and Bard were there. I began to set up camp on May 14 and by the next evening everything was in place. My pickup and camper would be home for my old dog and myself until June 22. A 4m x 4m dining tent was set up over a picnic table, to provide an escape from the anticipated mosquitoes and flies. It also served as an entertainment center and sleeping quarters



Roddick Lake Area

Roddick Lake Camp 2003: the author and granddaughter Jessica Watt *M. Kyle*

for the friends who stopped by regularly to help me search for birds.

In spring 2003 the water level of Roddick Lake was very low, and the 100m wide beaches provided an ideal feeding and loafing area for resident and migrating shorebirds. A long time local resident remarked he had never seen so little water in the lake in May and June, and by October 2003, Roddick Lake was completely dry. He went on to say that the water level from about 1940 through 1980 had been at least 2m higher, and a look at past beach locations quickly confirmed this. The higher water level in 1927 would have provided very little shoreline for the wading birds to forage and explains why Mitchell and Bard recorded fewer shorebirds.

Since I am hearing impaired, especially for higher frequencies, I use what I refer to as the "cowbird" method of locating birds – I sit quietly and watch. The system works for me. Fortunately I have friends with excellent ears and birding skills willing to assist me; two of them, Don Weidl and Carman Dodge, visited June 21st and 22nd, and their birding by ear added several species to my total.

Table 1 compares the 1927 and 2003 species observations; some of the highlights are given below.

In 2003, good breeding records were obtained for Black-and-white Warbler and Brown Creeper. On May 31, while sitting quietly, watching for birds, I was fortunate to observe a Black-and-white Warbler carrying nesting material. I was able to document the nest building to the fledging of 5 young on June 24th. The nest of this warbler has been found on very few occasions in Saskatchewan.

Alan Smith discovered a nesting pair of Brown Creepers while leading the Saskatchewan Natural History Society group on the June 7th spring meet bird walk. The nest entrance was so well concealed that the adults carrying food seemed to just disappear into the trunk of the nest tree.

Barred Owls were sighted and heard on several occasions, and although no nest search was conducted, the evidence strongly suggests a breeding pair. Another highlight was Murray Kyle's brief sighting of a Northern Mockingbird on May 21st, a bird near the northern limit of its range for sporadic wandering.

The lack of 2003 sightings of the White-winged Scoter, Upland Sandpiper, Franklin's Gull, Common Nighthawk, Cliff Swallow, Loggerhead Shrike, Western Meadowlark, and House Sparrow would be consistent with decreased numbers or a retraction of ranges since 1927. The lack of Marsh and Sedge Wren sightings probably relate to dying off of bulrush during drought years and a declining lake level.

My 2003 observations will provide some comparisons should someone decide to repeat the project again after the passage of another three quarters of a century.

Acknowledgements

I thank my friends Murray Kyle and Alan Young, who gave freely of their time and expertise whenever possible. Carman Dodge, Alan Smith and Donald Weidl added greatly to the data. I would also thank Dana Jones for her assistance with the maps, my granddaughter Jessica Watt for her cheerful manner, nest finding ability and patience teaching grandpa to use a computer, and Stuart Houston for his ongoing encouragement and assistance in preparing this report.

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Black and White Warbler on nest, 10 June 2003 *M. Kyle*

SPECIES	1927	2003	SPECIES	1927	2003
COMMON LOON	O	C	COMMON SNIPE	O	C
PIED-BILLED GREBE		B, C	WILSON'S PHALAROPE	O	C
HORNED GREBE	O	C	FRANKLIN'S GULL	O	
RED-NECKED GREBE	O N	C, B	BONAPARTE'S GULL	O	
WESTERN GREBE	O		RING –BILLED GULL		C
AMERICAN WHITE PELICAN		U (30)	CALIFORNIA GULL		C
DOUBLE CRESTED CORMORANT		U	BLACK TERN	O	C
AMERICAN BITTERN	O	U	MOURNING DOVE		C, Y(2)
GREAT BLUE HERON	O		BLACK-BILLED CUCKOO	O	U
CANADA GOOSE		U	GREAT HORNED OWL	O	U
GREEN-WINGED TEAL	O	C	BARRED OWL		U, B
MALLARD	B	C,B (30)	COMMON NIGHTHAWK	S	
NORTHERN PINTAIL	O	C	RUBY-THROATED HUMMINGBIRD	O	U
BLUE-WINGED TEAL		C, B	YELLOW-BELLIED SAPSUCKER	N, S	C
NORTHERN SHOVELER		C	DOWNY WOODPECKER	O	U
GADWALL		U	HAIRY WOODPECKER	O	U
AMERICAN WIGEON		O	NORTHERN FLICKER	O	U
CANVASBACK	O	C	PILEATED WOODPECKER		U
RING-NECKED DUCK	B	C, B	OLIVE SIDED FLYCATCHER		U
LESSER SCAUP	B	C	WESTERN WOOD-PEWEE		U
WHITE-WINGED SCOTER	N, S		YELLOW-BELLIED FLYCATCHER	O	U
COMMON GOLDENEYE	O	C	ALDER FLYCATCHER		U
BUFFLEHEAD	O	C, B	LEAST FLYCATCHER	O	U
RUDDY DUCK	O	C, B	EASTERN PHOEBE	N, S	U
TURKEY VULTURE		U (2)	GREAT CRESTED FLYCATCHER	O	U
BALD EAGLE		U	EASTERN KINGBIRD	S	C
NORTHERN HARRIER		C	PURPLE MARTIN	N, S	U
SHARP-SHINNED HAWK	B, N	U	TREE SWALLOW	N, S	N
COOPER'S HAWK		U	BANK SWALLOW	O	U
NORTHERN GOSHAWK		U	CLIFF SWALLOW	O	
BROAD-WINGED HAWK		U	BARN SWALLOW	O	U
RED-TAILED HAWK		C, B	GRAY JAY		U
AMERICAN KESTREL		C	BLUE JAY	O	U
MERLIN		U	AMERICAN CROW	S	U
RUFFED GROUSE		C	COMMON RAVEN		C
SORA	O	U	BLACK-CAPPED CHICKADEE	O	C, N
AMERICAN COOT	O		BOREAL CHICKADEE		U
SANDHILL CRANE		C	BROWN CREEPER		B, N
SEMIPALMATED PLOVER		C	HOUSE WREN	N, S	C, N
KILLDEER		C, N	SEDGE WREN	O	
AMERICAN AVOCET		C, B	MARSH WREN	O	
GREATER YELLOWLEGS		C	EASTERN BLUEBIRD	O	
LESSER YELLOWLEGS	O	C	MOUNTAIN BLUEBIRD	O	
SPOTTED SANDPIPER	O	C	VEERY		U
UPLAND SANDPIPER	O		GRAY-CHEEKED THRUSH	N	
SANDERLING		C	SWAINSON'S THRUSH		U
LEAST SANDPIPER	O	C	HERMIT THRUSH	O	C
STILT SANDPIPER		C	AMERICAN ROBIN	O	B, N
SHORT-BILLED DOWITCHER		C	GRAY CATBIRD	S	U
LONG-BILLED DOWITCHER		C	NORTHERN MOCKINGBIRD		U
BROWN THRASHER		U	SPOTTED TOWHEE		H
SPRAGUE'S PIPIT		H	CHIPPING SPARROW		C
CEDAR WAXWING		C	CLAY-COLORED SPARROW	S	C
LOGGERHEAD SHRIKE	O		VESPER SPARROW	O	U
WARBLING VIREO	O	C	SAVANNAH SPARROW		U
PHILADELPHIA VIREO	S	U	LE CONTE'S SPARROW	O	U
RED-EYED VIREO	O	B, N	NELSON'S SHARP-TAILED SPARROW		U
TENNESSEE WARBLER	O	U	SONG SPARROW	S	C, B
ORANGE-CROWNED WARBLER	O	C	LINCOLN'S SPARROW		U
NASHVILLE WARBLER		U	SWAMP SPARROW		U
YELLOW WARBLER	S	C, N	WHITE-THROATED SPARROW	O	C
CHESTNUT-SIDED WARBLER	O	U	WHITE-CROWNED SPARROW	O	
MAGNOLIA WARBLER	O		HARRIS'S SPARROW	O	U
YELLOW-RUMPED WARBLER	O	C, B	DARK-EYED JUNCO	N	C
PALM WARBLER	N, S		RED-WINGED BLACKBIRD	O	C, N
BAY-BREASTED WARBLER	S		WESTERN MEADOWLARK	S	
BLACKPOLL WARBLER	O		YELLOW-HEADED BLACKBIRD		U
BLACK-AND-WHITE WARBLER	O	N, Y(5)	RUSTY BLACKBIRD	S	
AMERICAN REDSTART	O	C	BREWER'S BLACKBIRD	O	
OVENBIRD		U	COMMON GRACKLE	O	
NORTHERN WATERTHRUSH	O		BROWN-HEADED COWBIRD	S	C
MOURNING WARBLER	O	U	NORTHERN ORIOLE	O	C, B
COMMON YELLOWTHROAT	O	U	PURPLE FINCH	O	C
WILSON'S WARBLER	S		AMERICAN GOLDFINCH	O	C
CANADA WARBLER	O		EVENING GROSBEAK		U
ROSE-BREASTED GROSBEAK	O	C	HOUSE SPARROW	O	

Bird species noted in 1927 and 2003 near Roddick Lake, SK. B-breeding; C-common; H-heard only; N-nest found; O-observed; S-specimen taken; U-uncommon; Y-young. Parentheses surround the number in a flock , the number of young etc.

CLOSE ENCOUNTER WITH A BOREAL OWL

H. D. (SANDY) AYER, 115 Strandell Cresc. SW, Calgary, AB T3H 1K8, E-mail: sayer@auc-nuc.ca

Since moving to Calgary in June 2003, I had been lamenting the comparative scarcity of birds in and around our yard. Back in Regina, from our house across from Wascana Creek, I'd accumulated a respectable yard list of 116 species in 15 years of birding. Now I was living across from an electrical substation and struggling to break the 20 species barrier. I was also missing the great vees of geese, ducks, Tundra Swans, and Sandhill Cranes (always with the hope of a Whooping Crane) that would wing their way south over our house every autumn. Avian grace intervened on the evening of 23 September, just after 9:00 p.m., as I was leaving the house to take Angelo, our pet sheltie, for a walk.

"Is it alive?" The voice belonged to Karen Cunningham, our next-door neighbor. She and her husband Mike and son Ryan were hunched over the splayed form of a bird on their driveway (Figure 1). The bird had struck their living room window with such force that they heard the sound while watching television at the other end of the house.

It was obviously a small owl. Quickly exchanging a disappointed Angelo for *The Sibley Guide to Birds*, I began observing the bird. When it first raised its head off the paving stones, I got a look at the streaking on its breast. In the poor light I couldn't tell what color brown it was, and so I initially concluded that it must be a Northern Saw-whet Owl.

The bird became more alert and swivelled its head almost 180 degrees, so that the garage light illuminated it enough to reveal a pale bill, a chocolate-colored upper body sprinkled (including the head) with small evenly-distributed white spots, and a facial disk with a broken black border that gave the face itself an angry look. The Northern Saw-whet is the most common small owl in these parts,[4] but this owl lacked the Northern Saw-whet's white dorsal "braces," and as it extended itself to its full length (Figure 2), I could see that it was in fact larger than a Saw-whet, about the size of an American Robin, though bulkier. So there it was: my life Boreal Owl handed to me, as it were, on a silver platter. A couple

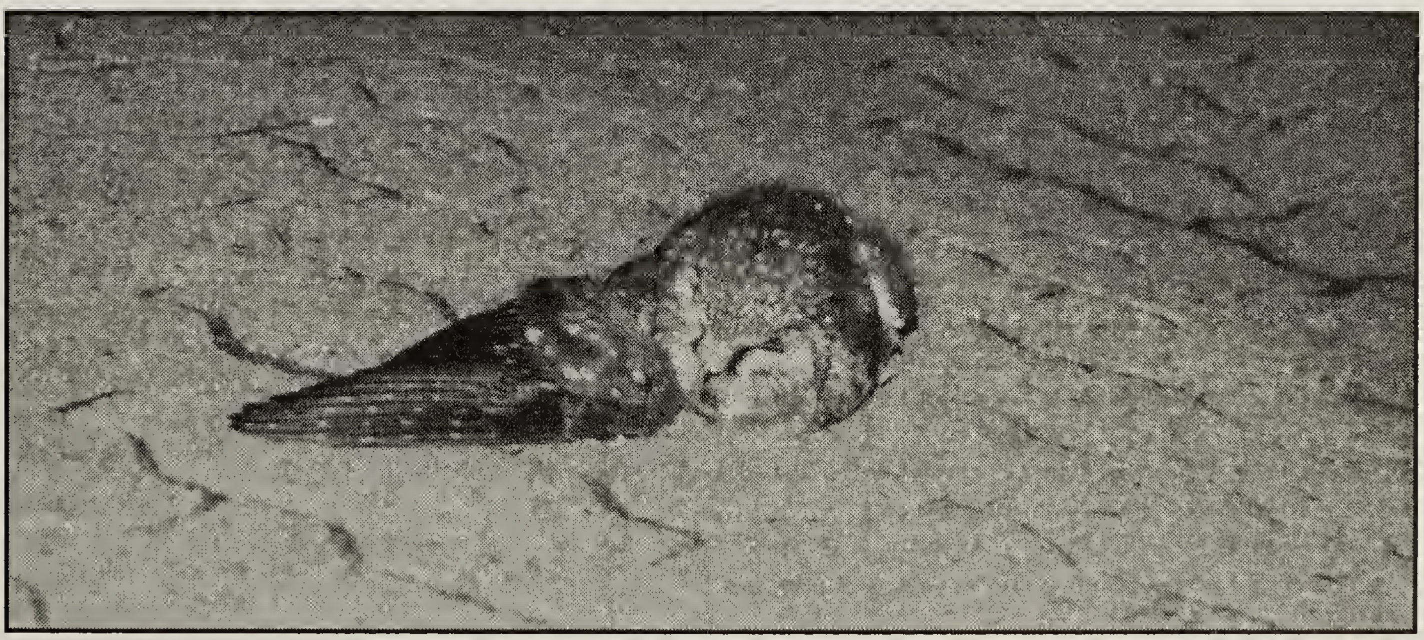

Figure 1. Splayed Boreal Owl on driveway

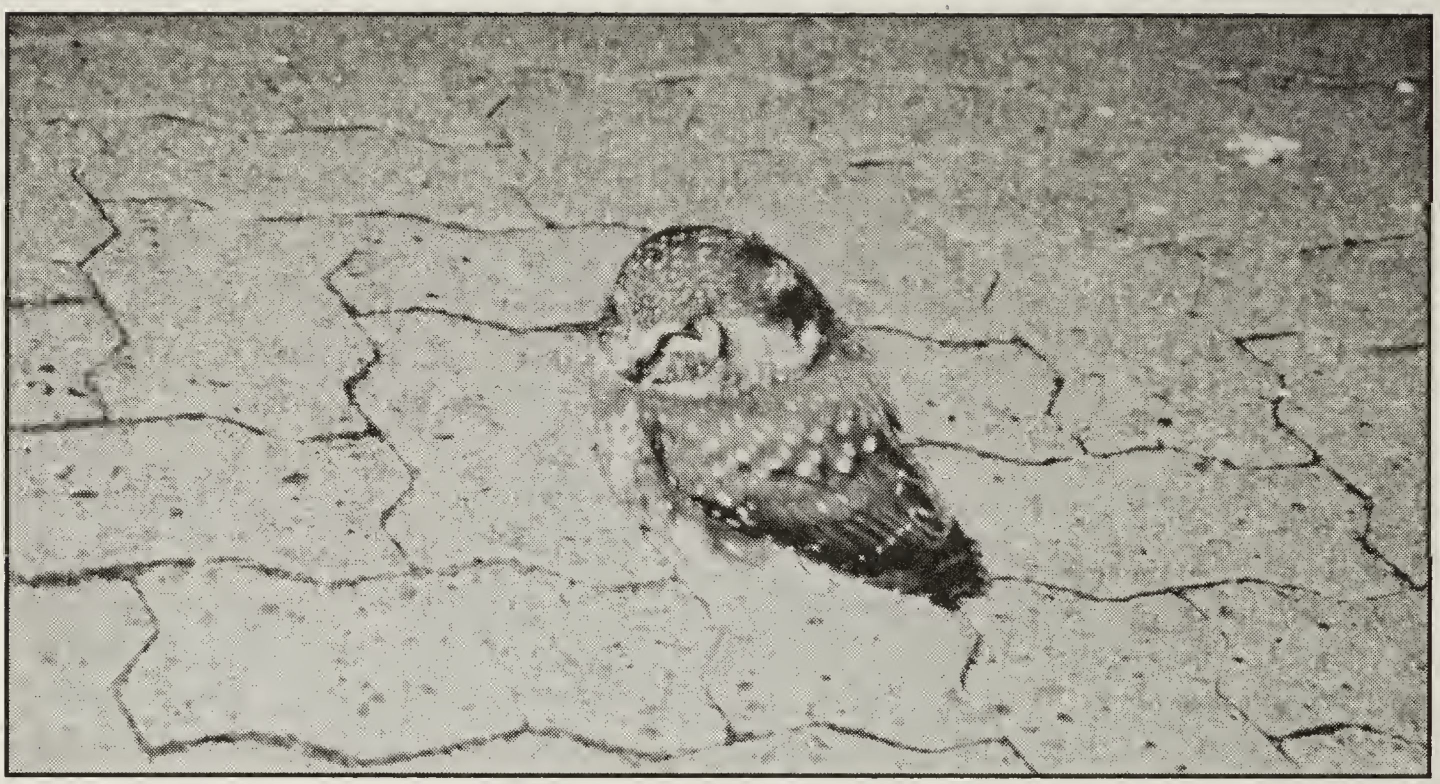

Figure 2. Boreal Owl recovering from collision impact

of minutes later, now fully recovered, the owl flew into the ash tree in our front yard to become my most memorable yard bird ever.

According to *Birds of Alberta*, the province "is one of the best places in the world to encounter this pint-sized owl, even though few birds are seen each year."[1] Indeed, this was, according to Phil Cram, chair of the Calgary Field Naturalists' Society Bird Study Group, the first time anyone had seen a Boreal Owl in the city since 2000. It was the first of three sightings for 2003, the last of which occurred on 14 December during the Christmas Bird Count (Phil Cram, pers. comm.).

But what had caused this owl of the boreal forest to crash into my neighbors' living room window? Had it panicked while fleeing a bird of prey? This seems plausible, although the only potential pursuer likely to be active at that time of night was the Great Horned Owl, which will kill any owl that intrudes into its territory.[2] This species nests in Edworthy Park, a mere two km away, but to my mind the panic hypothesis still depended too much on coincidence to be convincing.

Was the owl perhaps itself pursuing prey at the time? House Sparrows roost in the ash tree in our front yard, but Boreal Owls in the Rockies rarely feed on birds,[3] and then only when they have difficulty locating the voles, mice, and shrews that comprise their usual diet.[2] The grassy field between our house and the substation probably holds lots of small mammals (I've heard them in the grass), so the owl wouldn't have had to resort to birds. However, it probably hadn't begun to hunt prey of any kind, for Boreal Owls usually don't begin searching for prey until at least two hours after sunset,[2] and on this particular night sunset came at 7:33 p.m.[5]

Karen Cunningham thought that the flying owl had seen the reflection of nearby trees in the window, which was illuminated only by distant street lights, and simply failed to change course. I put the question via e-mail to owl expert Bill Lane, who agreed with Karen's assessment. This explanation also accords well with the Boreal Owl's flight patterns, for it "moves with ease through dense forest. Often it flies low under the thickest branches, sliding silently between the saplings and underbrush."[2]

If this hypothesis is correct, then the owl could have been migrating (or, more properly, "irrupting"). Indeed, most accidents involving birds and stationary objects occur during migration.[6] However, Boreal Owls' sporadic irruptions southward usually occur only once every four years or so in response to massive die-offs in their mammalian prey. No irruption seems to have occurred in the winter of 2003, at least if the lack of reports on birding discussion lists is anything to go by. Hence, post-breeding dispersal, if the owl we saw was a juvenile, or simply the nomadic tendencies of both females and juveniles of the species, may best account for this particular bird's movements (Bill Lane, pers. comm.). Male Boreal Owls, by contrast, tend not to leave their territories unless prey is very scarce.[2]

I'd appreciate hearing from anyone who can shed any further light on the probable cause of this accident.

In the meantime, I continue to keep a close eye on my neighbors' house, for who knows when my life Northern Hawk and Northern Pygmy owls might just come crashing into their living room window?

Acknowledgements

I would like to thank Phil Cram for the information he provided on Boreal Owl sightings in Calgary; Bill Lane for his expert observations on the behavior of owls; Trevor Herriot, Tim Heath, Eric Greenway, and Diane Ayer for reviewing the manuscript; Saundra Lipton for database mercies; and Karen Cunningham for taking the photographs and for vocalizing her discovery at just the right time.

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"The Birch Hills form the dividing ridge between the water which flows into the main Saskatchewan and the Assiniboine, or Red Deer and Swan Rivers. The remarkable profusion of flowers gives extraordinary beauty to large open areas; they generally occur in parterres of several acres in extent occupied by one species, here the yarrow, there the fireweed, then a field of a species of helianthus, followed by *Liatris scariosa*. When viewed from an eminence, the country appeared to be clothed with pink, white, yellow, and blue, in singular contrast to the uniform tint which prevails on the great prairies of the Little Souris."

Henry Youle Hind, *Narrative of The Canadian Red River Exploring Expedition of 1857 and of the Assiniboine and Saskatchewan Exploring Expedition of 1858*, p. 407

PAINT FLAKES ON THE EXTERIOR AND IN THE WALL OF A RUBY-THROATED HUMMINGBIRD NEST

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R3T 2N2

Introduction

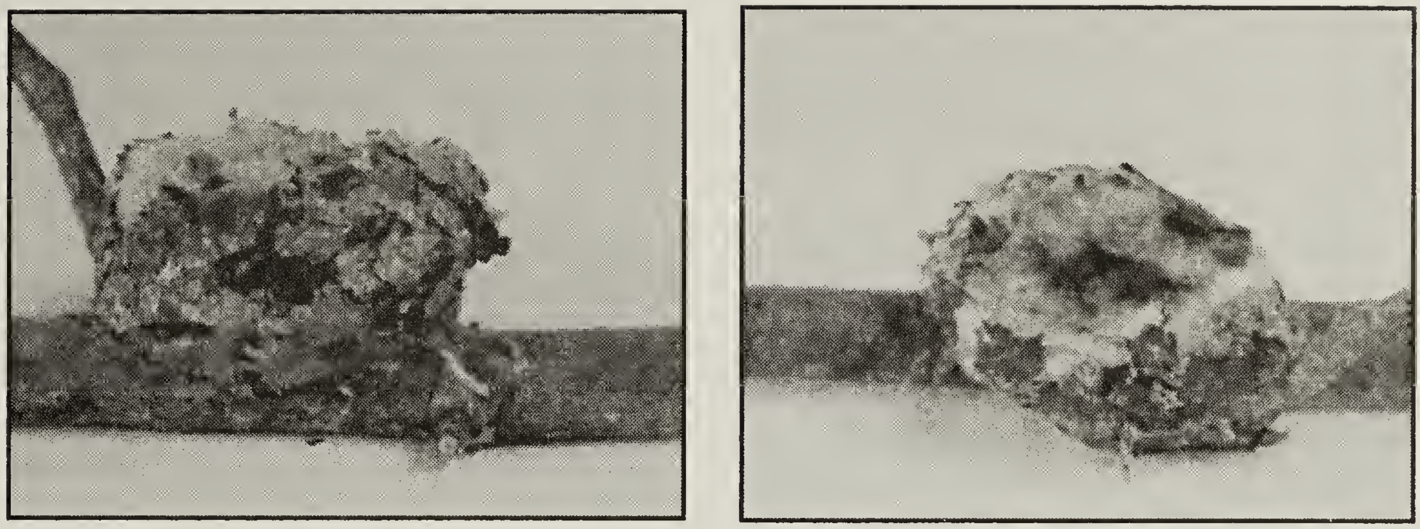
The incorporation of lichen flakes on the outside of nests of many species of birds is well known in North America, especially among the hummingbirds, gnatcatchers and some pewees.[3,8] Deception of visual predators has been the function most widely suggested for this.[1,3,15,18] Welty (p. 283) assumed that "such a covering, which often matches the surroundings, helps make the nest less conspicuous".[18] The nest of the Long-tailed Tit, in Europe, was described by Perrins (p. 73) as "...beautifully camouflaged [with greyish lichens], especially against a tree trunk",[11] and Nicholas and Elsie Collias (p. 148) suggested that lichen flakes act as "...camouflage of the exterior of the nest to resemble the immediate environment," especially as many of these nests are saddled on branches and look like knots.[3]

Although some workers have acknowledged that lichens, other plant parts or white spider cocoons attached to the exterior of nests may have some utility, others have used terms such as "adornments" and "decorations" to describe them.[12,15,18] Alexander Skutch, for example, stated (p. 104) "...we are tempted to regard them as adornments and apply the term 'decorators' to the birds who so embellish their homes."[15] It is currently believed, however, that these materials are more than just decorations and in some way enhance the reproductive success of the nesting birds.

Two hypotheses have been presented to explain the function of lichen flakes and white spider cocoons attached to the external surfaces of bird nests: the branch-matching hypothesis (masquerade) [3] and light-reflecting hypothesis (crypsis).[5] In the former hypothesis, a nest is considered to resemble a part of the branch to which it is attached, such as a knot, whereas in the latter, following Endler,[4] the nest reflects light and dissolves into the background beyond the site of attachment. Hansell[6] tested these hypotheses by examining nests and their positions on the supporting branches, and the extent of lichens covering the branches. His observations supported the crypsis hypothesis, as the nests are concealed because light that falls on them is reflected and they dissolve into the background. The masquerade hypothesis was not supported because most nests were wider than the branches to which they were attached and these branches tended not to be covered with lichens. As little is known about the predators on the contents of such nests, the hypotheses proposed to explain the adaptive significance of this use of lichen flakes have been tested only indirectly.

Observations

Here I report on flakes of paint applied to the outside and as part of the body of the nest of a Ruby-throated Hummingbird. In August 1984, Luke Maynard brought the empty hummingbird nest in its original position on a branch to the University of Manitoba Zoology Museum (UMZM 2851). The nest was found in St. Malo Provincial Park, Manitoba, about 70 km south of Winnipeg, and has flakes of green paint, most dark green (corresponding to "dark green," no. 262, in Smithe[16]) with some light green ("emerald green," no. 163), covering nearly its entire outer surface (Fig.1). Maynard had not noticed whether the green paint might have come from a nearby building or bench. A few lichen thalli were on the outside of the nest where paint flakes were absent. I did not dissect the nest, however, at least three flakes of paint can be seen incorporated into the plant down used



Two views of a Ruby-throated Hummingbird nest (UMZM 2851) showing paint flakes on the exterior.

to construct the body of the nest. The paint flakes are attached to the nest and branch with strands of spider silk, which are clearly visible under a dissecting microscope. The 35-cm portion of the branch collected with the nest was devoid of lichens, except for a small patch about 45 mm from the nest. The nest was also wider than the branch onto which it was saddled (38 mm versus 12 mm, respectively); thus, it did not resemble a knot. These attributes support the predictions of the crypsis hypothesis.

Discussion

This is not the first record of paint flakes used on the outside of a Ruby-throated Hummingbird nest. On the front cover of *Blue Jay* (Volume 50, June 1992) there is a photograph by the late Doug Gilroy of a female Ruby-throated Hummingbird incubating eggs or brooding young in a nest at Regina Beach, Saskatchewan. Four or five flakes of light green paint are visible on the outside of the nest, whereas lichens were attached to the rest of its surface. In another species, Anna's Hummingbird, two nests from California had external layers composed of flakes of paint instead of the usual lichen flakes, with white flakes on one nest and sky blue flakes among white flakes on the other.[6] Man-made materials other than paint, such as white paper, newsprint and polystyrene also have been used on the exterior of nests.[6,7] While examining nests in the collections of the United States National Museum, Mike Hansell (pers. comm.) noted newspaper fragments among the pieces of lichen on the outside of 4 of 19 Common Bushtit nests. One of these nests was collected in 1892, in San Diego, California, which indicates this has been going on for more than 100 years!

Other possible functions for the incorporation of lichen flakes or other materials on the exterior of nests require testing. Upon initially noticing the paint in the wall as well as on the outside of nest UMZM 2851, I wondered whether flakes, lichens or otherwise, provide support for the nests, even when placed only on their outsides, but especially when also incorporated into their walls. In three other Ruby-throated Hummingbird nests, large lichen thalli completely covered the outside of one nest (UMZM 2848) and tiny pieces of lichen were "sprinkled" on the outsides of the others (UMZM 2849, 2850), but no lichen was visible in the walls of any of them. A fourth nest (UMZM 2862) had chips of bark attached to the outside. These observations suggest Ruby-throated Hummingbirds use whatever is available nearby to cover the exterior of their nests, or they may place their nests near sources of material appropriate for use on their outsides.

Others have suggested lichens may minimize soaking of the plant down in the structural layer, by shedding water when it rains or humidity is high, thus protecting nests against disintegration.[6,17] It is evident from photographs of nests of several other hummingbirds, particularly tropical species, that nests constructed with materials other than plant down generally lacked lichens or only a few were along the rims of the nests.[10,13,14,17] Tests are needed to determine whether lichens support and/or protect the physical integrity of the nests, but at the same time possibly rendering nests less conspicuous to predators.

It has also been suggested that lichens play a role in nest sanitation by controlling the number of parasites in nests.[9] However, whereas the other materials, such as green leaves, that apparently do control parasitic arthropods, are used to line nests,[2] a different mechanism surely would exist in this case because the lichens are not used in the lining of hummingbird nests. In a different vein, Hansell speculated that lichens reflect radiation and, hence, possibly play a role in controlling the temperature of the nest.[7,8] This might be in conjunction with variation in the materials used to construct nests and the degree of insulation,[17] including the type and density of lichen flakes on the outside. Clearly, not all of these ideas and hypotheses are mutually exclusive and it may turn out, with testing, that more than one is supported.

Acknowledgements

I thank Luke Maynard for donating the hummingbird nest with the paint flakes on its exterior to the University of Manitoba. Personnel of the Delta Waterfowl Foundation salvaged one of the other hummingbird nests examined and Robyn and Todd Underwood found another nest. Jolanta Miadlikowska kindly provided a copy of her paper published in the Polish literature. Bruce Ford examined the plant materials in the linings and on the exterior of some of the nests. Robert Barrow prepared the photographs. Mike Hansell read the manuscript, offered several useful suggestions, and provided information on the use of newspaper fragments in Common Bushtit nests.

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SURPRISES AT THE SCISSONS CENTRE NEAR SASKATOON

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Species traveling considerable distances beyond their historic ranges may use valley corridors, important areas worthy of increased study as well as protection. Eagle Creek is one such corridor as MAPS volunteers at the Ed and May Scissons Environmental Education Center in the Eagle Creek coulee found out last summer. MAPS (Monitoring Avian Productivity and Survivorship) operates a mist netting program at the Scissons Center situated 56 km NW of Saskatoon, and on July 27, volunteers caught and banded two species north of their usual ranges. One, an adult male Lazuli Bunting, a fair bit north of its expected range, may have simply been passing through as it was caught only once. Multiple captures of another unexpected species, the Yellow-breasted Chat, an impressive, thrush-sized member of the wood-warbler group, indicate breeding at the site (Figure 1).

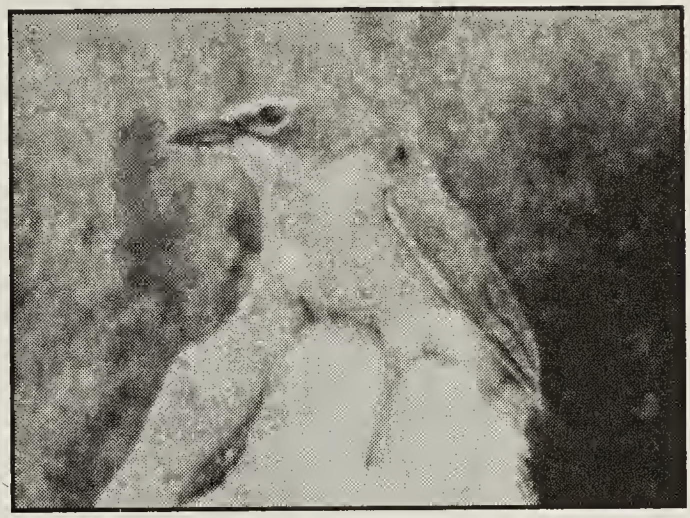


Figure 1. Yellow-breasted Chat at the Scissons Centre, May 2003

Terri Troupe-Logue

The MAPS station at the Scissons Center consists of 10 mist nets arranged in a circle on an 18 hectare plot within a quarter section of native prairie straddling the coulee at Eagle Creek. Volunteers catch and band songbirds during 6-hour morning sessions

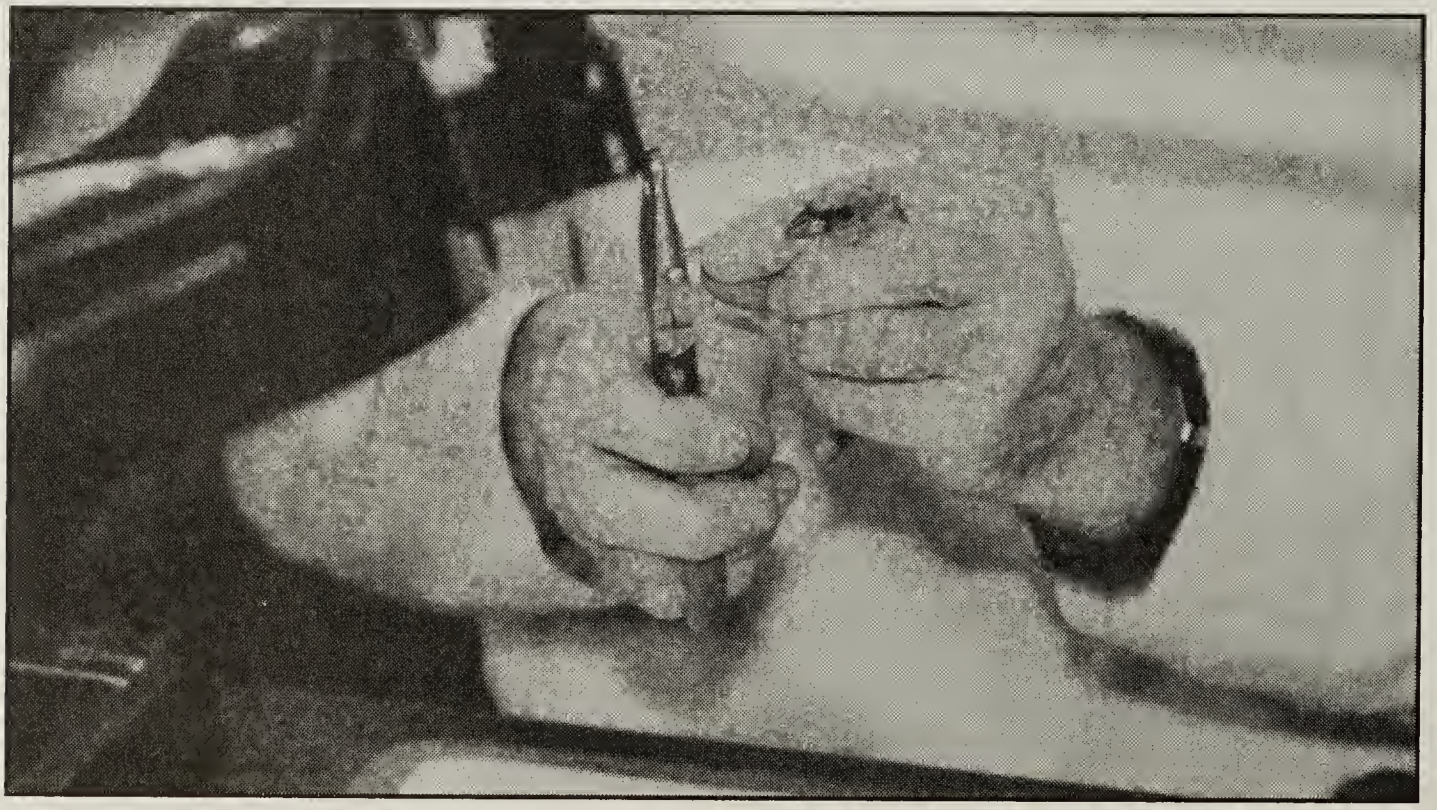
Figure 2. Terri Troupe-Logue removes a Gray Catbird from a mist net *Kim Strange*

held once in each 10-day stretch throughout the breeding season from June 10 to August 8 (Figures 2 and 3).

Four years ago, Rob Wapple, the field biologist who completed the habitat assessment for this MAPS site, suspected that the breeding range of the Yellow-breasted Chat might extend further north than previous records indicated.[1] He suggested that sampling a creek valley in central Saskatchewan could provide the evidence.

In 2002, Melanie Elliott had a brief glimpse of a Yellow-breasted Chat at the Scissons site. On July 5, in 2003–the station's third year of operation–the first Yellow-breasted Chat was caught, in net #3. It was an adult male in full breeding condition. Later that morning, in the adjacent net, #2, we found an adult female, sporting a "full" brood patch, indicating nesting activity. (When she was recaptured in net #3 on July 20, her brood patch was ranked as "wrinkled", the next expected stage of brood patch condition.) The locations of the captures provided clues as to nest location and later that day, the male was seen displaying to his mate from atop a thicket directly between the cuts where nets #2 and #3 had been placed. A third Yellow-breasted Chat was captured on 27 July in net #8, about 200 m south of nets #2 and #3. Apparently, the breeding pair of birds were not the only members of their kind on the property! The sex of this new bird was not determined, but molt signs indicated it was an adult. On August 4th, the last banding day of the season, as if to complete the saga, a fledgling chat was netted. It can't be said for sure that it was an offspring of the pair banded earlier, but it can be considered evidence of breeding in the Saskatoon area, and more specifically, the northernmost stretch of the Eagle Creek valley.

The MAPS station at the Scissons Environmental Education Center is one of about 500 MAPS stations across the continent and is the only one in Saskatchewan. This international project, managed by the Institute for Bird Populations in Point Reyes, California, enables scientists to monitor songbird populations as a measure of environmental change. To date, Scissons Center volunteers have banded approximately 650 birds belonging to 48 species. Twenty-eight species of birds were captured during the 2003 season. The center is operated by the Saskatoon Catholic Schools Environmental Education Department, with the support of the



Banding the Lazuli Bunting at the Scissons Centre ***Tom Chad***

Saskatoon Catholic Schools Foundation, and is mandated to expose students to real-life field study of prairie ecology.

Acknowledgements

Last Mountain Bird Observatory manager Al Smith has generously shared his time and expertise. Bird Studies Canada is also to be thanked for assistance with some of the initial start-up costs. Station volunteers include members from the Saskatoon Nature Society, the University of Saskatchewan Extension Division, the Saskatoon Zoo Society, University of Saskatchewan students, as well as staff and students from Saskatoon schools. Special thanks to CWS biologist Brenda Dale for providing additional training opportunities for the volunteers.

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FIRST BREEDING RECORD OF THE DOUBLE-CRESTED CORMORANT IN THE CRESTON VALLEY, BRITISH COLUMBIA

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Double-crested Cormorant
R. Wayne Campbell

Introduction

The Double-crested Cormorant breeds throughout much of central interior North America, where major concentrations are centered on lakes in the prairie provinces.[6,7] Smaller numbers breed locally on the Pacific coast and along the Atlantic coast.

In British Columbia, the Double-crested Cormorant breeds regularly in the Strait of Georgia, where it is present year-round.[2] In the interior, breeding was first confirmed in 1993 when four pairs were found nesting in an American White Pelican colony at Stum Lake, west of Williams Lake.[9] The only other interior breeding record dates from 1997 when a pair was observed feeding two young on the Cheslatta River, southeast of Burns Lake in the center of the province (Guy Monty, pers. comm.).

This paper documents the third interior breeding of Double-crested Cormorants in British Columbia and discusses interspecific competition with a long-established Great Blue Heron colony known as the Leach Lake colony.

Study Area and Historical Changes

Creston Valley, 110 km west of Cranbrook, in extreme south-central British Columbia, is well known for its diversity and abundance of birds.[1] Double-crested Cormorants were first recorded in the valley in 1982 when a single bird was sighted flying along the Kootenay River (S. Forbes, pers.comm.). During the following decade, 1 to 12 cormorants were regularly reported from late June to late September with the exception of 1988 when 20 cormorants were observed.[13] From 1993 to 1999, up to eight birds were frequently observed from early May to late September, and since 2000, cormorant numbers have ranged between 12 and 28 birds annually (pers. obs.). Breeding was suspected but not confirmed for the years 1999 to 2002 when adult and juvenile cormorants were observed perched on deadheads in the Kootenay River.

Field Observations in 2003

On 31 May, while monitoring Osprey nests along the Kootenay River, I observed four adult Double-crested Cormorants within the Creston Valley Wildlife Management Area (CVWMA) on the eastern boundary of the Leach Lake Unit. The cormorants were perched high in mature, riparian Black Cottonwood (*Populus balsamifera ssp. trichocarpa*) trees occupied by a breeding colony of Great Blue Herons. The cormorants appeared to be on territory and were vocalizing loudly with hoarse, guttural calls.

On 6 June, an adult cormorant was observed sitting in a small stick nest, (nest #1), approximately 28 m from the ground in a live cottonwood tree also occupied by two pairs of nesting Great Blue Herons. The cormorant's mate delivered live cottonwood branches to the nest, which were then woven into the existing base. The pair was observed copulating at the nest. A second adult cormorant was observed sitting in a nest, (nest #2) of green-leafed cottonwood branches built in the crotch of a large dead branch on a live cottonwood tree unoccupied by herons.

On 9 June, nest #1 was complete and an adult cormorant was noted in an incubating position. In nest #2, an adult was weaving nesting materials while sitting in the nest as its mate perched nearby. On this visit, a third pair of cormorants was building a nest (nest #3) in the same cottonwood tree as nest #1. One member of this third pair perched on a branch and tucked live green cottonwood boughs under its body, bending them to weave around a nearby vertical branch.

On 16 June, nest #3 was complete with many new, green cottonwood branches added. Three adults were observed sitting low in nests, with only heads and tails visible. Visits made on 27 June and 8 July confirmed that the nests were still active as three adults remained in incubating positions.

Young were first observed in nests #1 and #2 on 15 July. In nest #1, a naked, wobbly-necked nestling was observed moving about at the adult's side while being brooded. A single chick observed in nest #2 was more mobile and poked its head up near the adult's wing. Although the adult in nest #3 frequently shifted its position, no young were observed. In the second week of July, southern British Columbia was in the throes of a heat wave with daily temperatures in the Creston Valley ranging between 33-37°C .

During late July, nestling activity was observed in each nest. An adult was sitting high in nest #1 where two black downy young with short bills and pale yellow throat skin were observed moving about in the nest. The mate arrived and fed both young. At nest #2 the adult was sitting on the nest rim and two black downy young were observed. When the mate arrived to feed the young, two smaller nestlings suddenly appeared thrusting their heads up with gaping mouths and were fed a regurgitated liquid. At nest #3 a naked wobbly-necked young shifted its position at the adult's side.

During an early morning visit on 27 July, 2 immature cormorants and 19 adults, in addition to the 3 brooding adults, were perched in the upper canopy of the cottonwood trees. The nestlings were larger and more active in the nests. There continued to be two young in nest #1 (although a week later only one chick was observed), four young in nest #2, and three in nest #3. All were different sizes.

On 11 August, a total of eight young were observed standing in three nests, cloaked in black "woollies" but larger in size, with wing feathers developing and a deepening yellow hue on the throat pouch. The temperature on 11 August was 38°C and at nest #2 an adult cormorant was twice observed "watering" all four chicks. The adult flew a short distance upriver and, upon returning, inserted its head into a chick's mouth, allowing water to pour in for 2-10 seconds. Kuiken observed this behaviour at Doré Lake, Saskatchewan and suggests that "watering" occurs to compensate for the evaporation of water from the inner surface of the gular pouch on warm, sunny days.[8]

By 19 August, all eight young had well-developed wing, tail and body feathers. The parents were perched on nearby branches as their broods occupied the entire nest. Feeding was observed at two of the nests when an adult maneuvered to the rim while the hungry young vied for a spot close to the adult, poking and pulling at its gular sac until one young inserted its head into the adult's throat where food was regurgitated.

During the fourth week in August, the young now unattended by adults, were more mobile, leaving the nest to perch on nearby denuded tree branches and were observed stretching and flapping their wings in preparation for flight. It was surprising how "whitewashed" their webbed feet had become during the nestling period.

On 30 August, one young from nest #2 took flight down river and returned to the nest. Three of the eight young had fledged by 3 September, although all returned to the nest trees to be fed by the adults. By 7 September, all the young had fledged. This nest site was occupied for 98 days. The three pairs of Double-crested Cormorants successfully fledged eight young for an average of 2.7 young/nest.

Adult cormorant feeding young at nest #3 in late August ***Cyril Colonel***

Discussion

The first successful nesting of Double-crested Cormorants in the Creston Valley is likely due to the ideal nest sites in mature, riparian Black Cottonwood trees–sites safe from ground predators and close to feeding areas at Leach Lake and on the Kootenay River within 4 km of the colony. Wires et al. suggest that feeding sites should be within 10 km for successful colonies.[14]

The Double-crested Cormorant feeds on a wide variety of fishes, diving in shallow water to catch prey, which range from 3-40 cm in length. Preferred prey measures less than 15 cm.[14] Warm-water fishes available in the CVWMA marshes and sloughs include pumpkinseed (*Lepomis gibbosus*), yellow perch (*Perca flavescens*), largemouth bass (*Micropterus salmoides*), and black bullhead (*Ictalurus melas*). Northern squawfish (*Ptychocheilus oregonensis*), redside shiner (*Richardsonius balteatus),* largescale sucker (*Catostomus macrocheilus*), peamouth chub (*Mylocheilus caurinus*), and longnose sucker (*C. catostomus*) also occur in the Kootenay River and nearby Duck Lake.[4,10]

Potential Impacts of Nesting Cormorants

Nesting Double-crested Cormorants may have several effects on other colonial waterbird species including competition for nest sites and prey, and habitat degradation. In the 2003 breeding season, Great Blue Herons returned to the Leach Lake nest trees in early to mid-March, and by mid-April many adults appeared to be incubating. No competition for nest sites from Double-crested Cormorants was observed.

The most immediate impacts occur through nest substrate defoliation and tree die-off from droppings.[14] Leaves and small branches are stripped from nearby trees and the weight of birds and their nests can break branches.[12] The mature stands of Black Cottonwood trees along the Kootenay River were heavily "white-washed" by both herons and cormorants during the 2003 nesting season and the branches which supported the cormorant nests were completely denuded. Most colonial waterbirds damage vegetation at breeding and/or roosting sites and cormorants cause some of the most dramatic changes.[14] Cormorants can destroy their nest trees due to the seasonal accumulation of guano. The highly acidic droppings affect foliage and also disturb the ionic equilibrium in forest soils. Some colonies that have become established in coniferous or deciduous stands killed the trees within 3 to 10 years due to guano deposition.[14]

Disturbances

In coastal British Columbia, Double-crested Cormorants nesting on coastal islands have been negatively impacted by Bald Eagles and boat traffic, which cause adults to leave their nests, exposing eggs and chicks to predation by gulls, Common Ravens and Northwestern Crows.[3] In Creston Valley, although Common Ravens examined unoccupied heron nests, no predatory activity was detected near any active cormorant nests. In mid-July 2003, an Osprey dove repeatedly at an incubating adult cormorant in nest #3, but the adult did not flush from the nest. While an immature Bald Eagle stood in a stick nest eating a heron in mid-July, the incubating cormorants remained alert, facing in the direction of the eagle (pers. obs.).

During August, forest fires precipitated a flurry of helicopter activity. At times, the pilots flew directly over the nest trees, causing adults and immatures to flush from their perches while the unfledged young cowered in the nest and peered into the sky (pers obs.). Fixed-wing aircraft overflights appeared to have only a modest impact. Since this colony represents the third known breeding site for interior British Columbia, policies regarding minimum flight limits of aircraft, especially helicopter overflight, should be established.

In Canada, the Double-crested Cormorant is considered a species "*Not at Risk*" by the Committee on the Status of Endangered Wildlife as breeding numbers have been increasing significantly since 1975 throughout most of its range.[6] It is protected by provincial wildlife acts in the prairie provinces and in British Columbia. Pacific coast populations have declined, prompting the British Columbia Ministry of Water, Land and Air Protection to elevate the listing to "Red".

The future

Since Double-crested Cormorants have extreme fidelity to established colony sites, it is likely that birds will return to the Leach Lake heron colony.[14] Although both the Great Blue Heron and Double-crested Cormorant require similar nest sites (e.g. tops of mature trees), there appears to be little or no competition between the two species at the present time. During 25 years of surveys in the United States Great Lakes regions, the United States Department of Interior Fish and Wildlife Service has found that nesting cormorants have had minimal impact on heron activity and vice versa.[11]

As part of a long-term monitoring program established in the mid-1970s for interior colonial nesting birds in British Columbia, it will be important over the next decade to research subsequent breeding activity of Double-crested Cormorants, their effects on nesting Great Blue Herons, and impacts to the vegetative structure of the Leach Lake nesting colony.

Acknowledgements

I wish to thank Robert Louie of the Lower Kootenay Indian Band for access to private land. I would also like to thank Cyril Colonel for observation notes and photo-documentation throughout the nesting period. R. Wayne Campbell kindly provided helpful editorial comments and supplied the close-up photograph of an adult cormorant.

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EASTER WEEKEND WITH WHOOPING CRANES

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Pencil drawings by the author.

Good Friday, April 18, 2003

At 1:00 p.m., I received a phone call from a friend, Neil Sherman, who reported he had seen two adult Whooping Cranes seven miles south of Milestone on Sec 3-11-19-W2. With my camera and sketch pad in hand, I drove out to the east side of the section. I parked behind several tall willows in the west ditch in order to be less noticeable. The day was rather unsettled, cloudy with sunny intervals; a typical spring day with a chorus of frogs. An 80-acre summerfallow field ran along the east side of the section. I spotted the Whooping Cranes in a low area in the adjoining stubble field. The two cranes were with a flock of an estimated 5000 Sandhill Cranes, scattered over a large area. There was a body of water

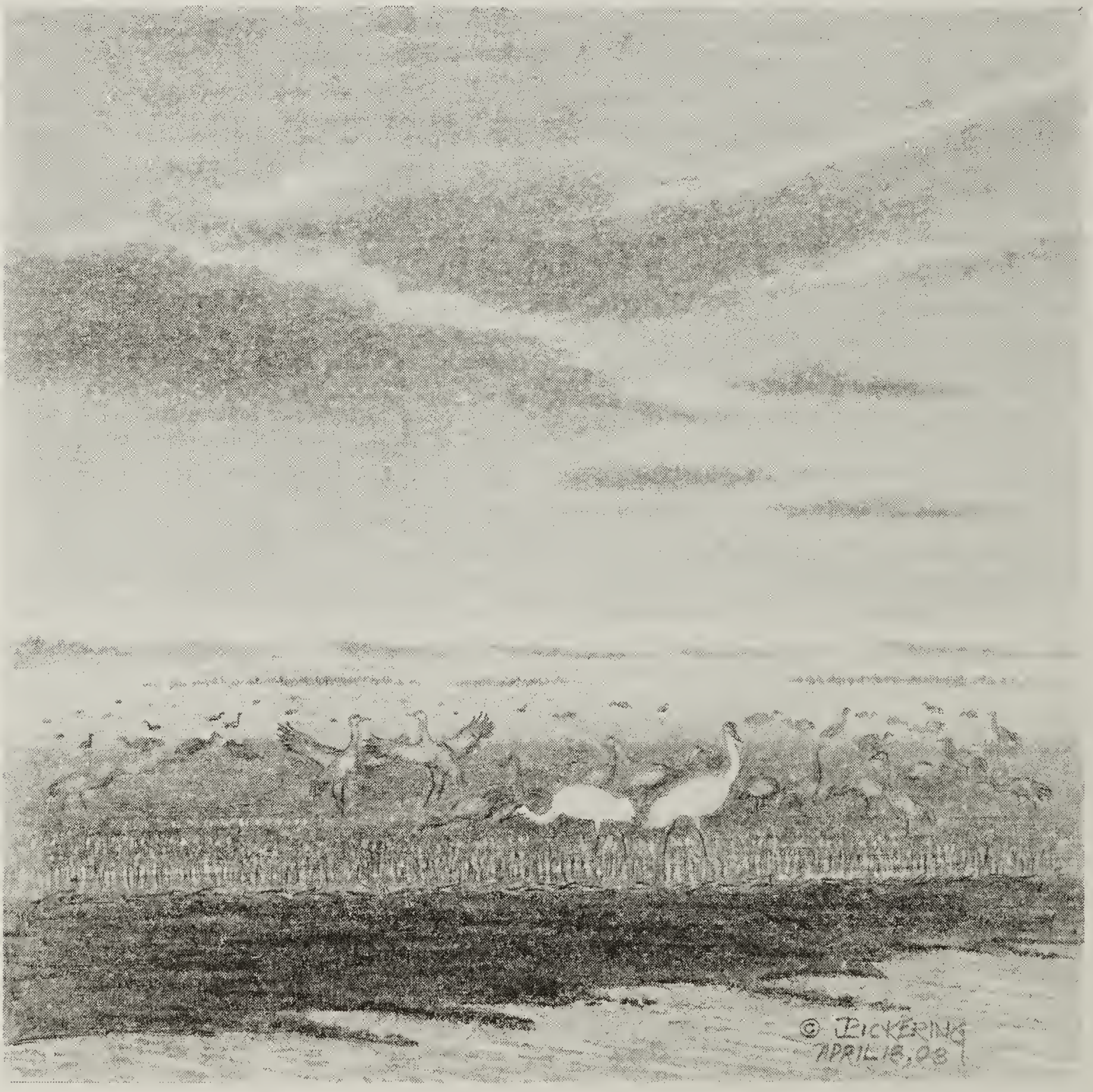


Figure 1. Sandhill and Whooping cranes feeding in a stubble field

on the summerfallow field from the spring runoff (Figure 1). The Whooping Cranes were continually feeding in the stubble field, looking up occasionally, appearing to be hungry after a lengthy flight. Some of the Sandhills were flying up a few feet, then dropping to the ground, chasing one another. The Whoopers remained in the low area of the field, paying little attention, and still feeding. I used 7 x 50 binoculars to view and sketch the cranes and some of the Sandhills. After 4 1/2 hours I returned home for the night.

Saturday, April 19, 2003

The weather was bright and sunny as I arrived back at the location at 7:00 a.m., and I parked behind the same willows. The two Whoopers were feeding along the edge of the stubble field, approximately 400 yards from where I was parked. The Sandhills were widely dispersed over a large area, in fact, some of the birds were feeding on voluntary plants, which were in a summerfallow field on Section 10 to the north. A few Sandhills, in pairs, were spreading their wings, springing in the air and calling.

I turned my attention to the two beautiful white birds in the morning sunlight. Their plumage was a brilliant white, with the contrasting shadows of the undersides of their neck and bodies. A steady breeze from

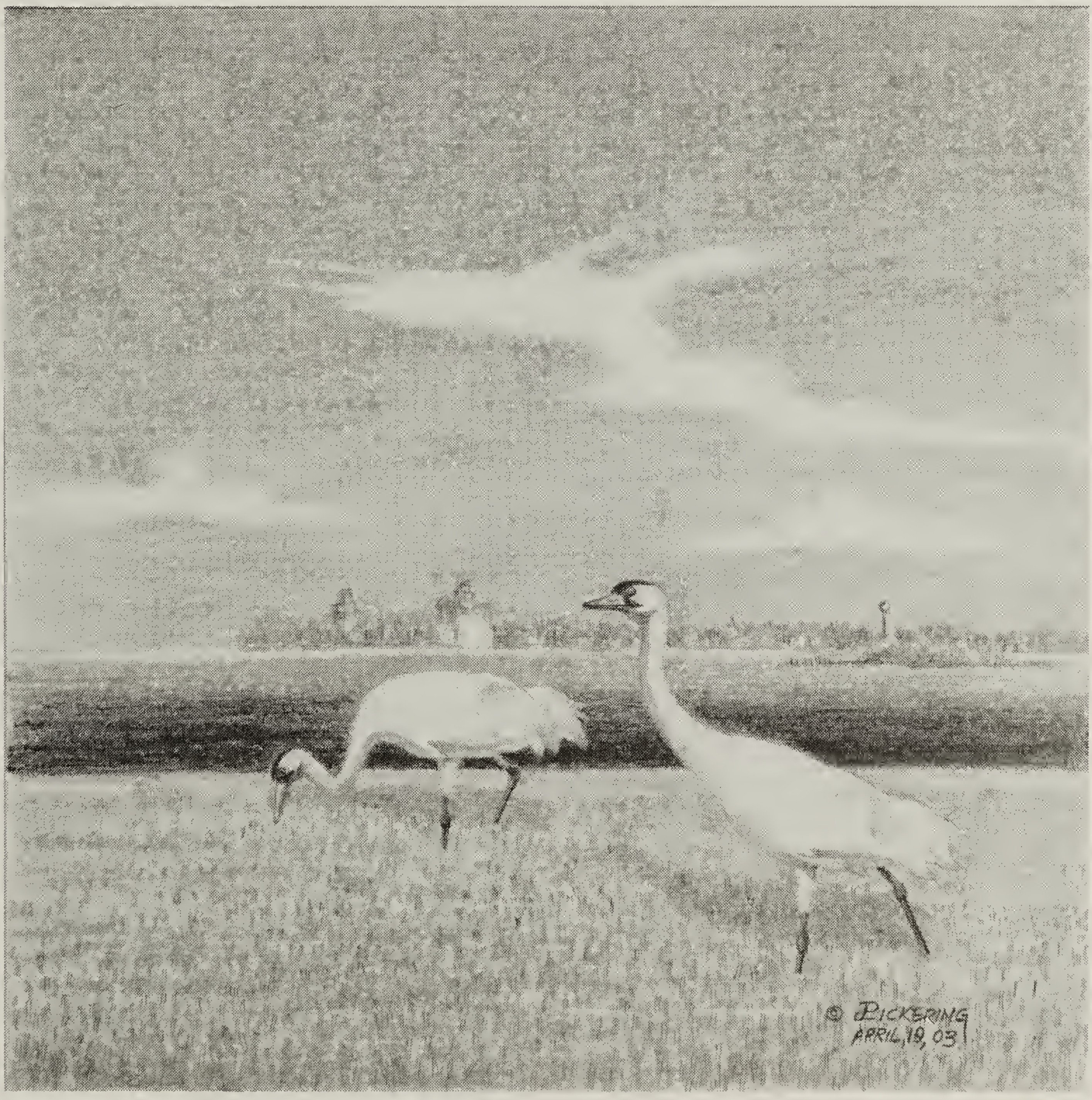


Figure 2. Whooping Cranes west of Lang, Saskatchewan

the southeast caused the feathers to lift and flutter–an inspiring sight, and a great opportunity to sketch a scene, putting the town of Lang in the background (Figure 2). Sometimes they sat down in the stubble field and fed on the grain in an arc as far as their long necks would reach. Then they moved a few feet and continued to feed in the same manner. They remained feeding until 10:50 a.m., then stood up and called, spread their wings and flew west, just above the stubble field to the low area where I had observed them on Friday. Using my binoculars, I could see water in that area, suggesting that they were getting a drink after the morning feeding.

When I returned after lunch, the birds had moved farther southwest to the middle of the section and were about 100 yards apart, resting. Each was standing on one leg, and both had their heads tucked under their wings. Even the Sandhills were relaxed, as if enjoying the lovely, quiet afternoon. That prompted me to relax and have a short siesta in my car. The Whoopers became active about 3:15 in the afternoon, flying very low, landing in the centre of the southeast quarter of the section. The road had a lot of shrubs–rose bushes, willows,

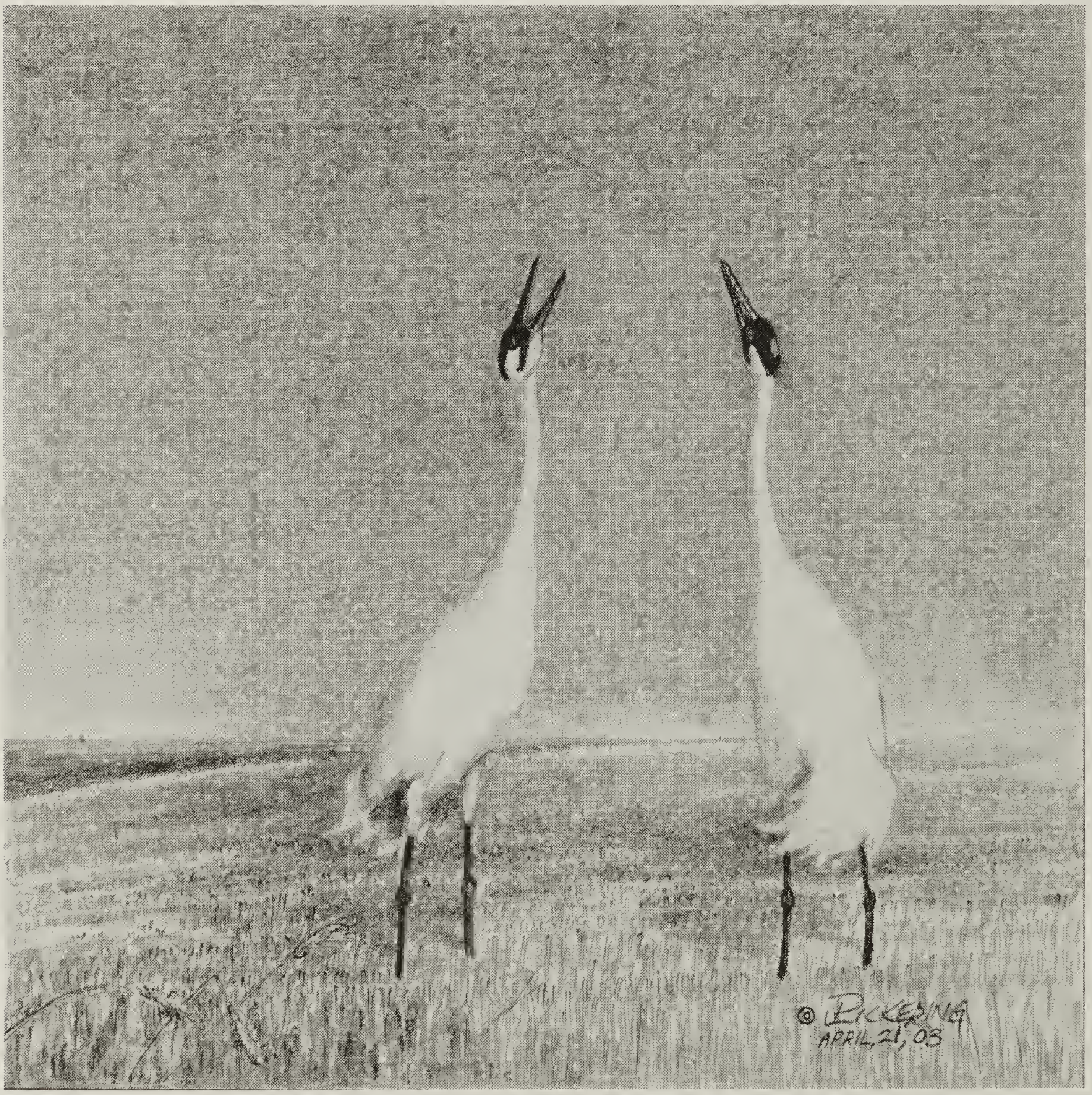


Figure 3. Whooping Cranes stretching their necks before taking flight

red osier dogwood–in the west ditch, so I drove south and parked behind the largest bush. The Whoopers were to the west, feeding among the scattered Sandhills. When I got home at dusk, I phoned Bob Turner of White City and Paul Geraghty of Avonlea, both of whom had worked with me at the Royal Saskatchewan Museum and we remain good friends.

Sunday, April 20, 2003

I drove back at 7:00 a.m. and spent the morning taking photographs and sketching, then went home to wait for Bob. He arrived at 2:00 p.m., and we drove to the west side of the location. Paul soon joined us and we viewed the Whoopers which were near the centre of Section 3. Shortly after 3:00 p.m., the cranes flew very low eastward and settled on the edge of the stubble field. We then drove to the east side of the section. The cranes were unconcerned with us and fed steadily along the ridge dividing the stubble and summerfallow fields. We watched them feed until dusk.

Monday, April 21,2003

The weather again was warm and sunny, and I arrived at the site at 7:05 a.m., spotted the Whoopers in the southeast corner of the section, feeding and drinking in the low areas. The birds seemed rather nervous as I watched from about 1/2 mile away. They finally flew toward the centre of the section, dropping down amongst the Sandhills. The wind was brisk from the southeast and I had a feeling conditions were ideal for them to leave. They walked around, spreading and flexing their wings.

At 11:25, the Whoopers flew northeast, landing close together roughly 250 yards from my vantage point. They seemed very alert, facing into the wind, lowering and raising their heads for several minutes.Their last movement before taking flight was stretching their necks skyward (Figure 3). At 11:35, I heard them call twice and with a short running start, they lifted into the wind. The first circle they made was approximately 1/4 mile in diameter. I followed their upward flight with binoculars and in 17 minutes they had completely disappeared!

The centrefold (p. 96-97) is a sketch from memory of their spiral flight, from right to left. The first circle was fairly flat. Many ellipses followed with each one becoming smaller. I have drawn only a few of them to show the Whoopers in various positions. It's surprising how close they flew to each other, at times almost touching one another's wings. Everytime they turned into the wind, the midday sun illuminated the whiteness of their plumage. When they reached a high altitude, they disappeared from sight, only to appear again when the sunlight caught them as they made their turn out of the wind. In my last view of them, they were just one tiny white dot, and then they were gone. The Sandhills remained, but when I returned at 1:15 p.m., they too had taken flight.

That Easter weekend was one I shall treasure for the rest of my life, and I felt very privileged to have spent it with those rare and beautiful birds.

There is pleasure in the pathless woods,
There is rapture in the lonely shore,
There is society where none intrudes,
By the deep sea, and music in its roar:
I love not man the less, but nature more.

- Lord Byron

FLOWERING RUSH, *Butomus umbellatus*, A NEW, POTENTIALLY INVASIVE, SPECIES IN SASKATCHEWAN

RANDY OLSON, 29 Potter Cr., Saskatoon, SK S7H 3L2

In the summer of 2003, Etienne Soulodre called the W. P. Fraser Herbarium at the University of Saskatchewan in Saskatoon to report a mystery plant. He had been talking to Allan and Linda Leslie, ranchers east of Young, SK who had noticed a conspicuous pink-flowered plant earlier in the summer in a wetland south of their home (Figure 1). Etienne visited the site and, based on some gardening catalogues that Linda and Allan had, he theorized that the plant might be Flowering Rush (*Butomus umbellatus* L.).

Etienne brought the plant to my attention when I was working as the curatorial technician at the W. P. Fraser Herbarium, and on September 17, 2003, I visited the site with Linda. Approximate coordinates for the locality are 51.7°N and 105.64°W. We found two 1.5 m^2 clumps growing at the edge of the wetland in fine-textured, water-saturated soil. Earlier in the summer, the plants had been seen growing in standing water but the plants were now thoroughly dried out and had set seed. I was able to confirm that the mystery plants were indeed Flowering Rush and collected several specimens, which were submitted to the W. P. Fraser Herbarium

Location of the two clumps of Flowering Rush ***Randy Olson***

(SASK) as collection number BU RO#1.

Associated species were Silverweed Cinquefoil (*Argentina anserina* (L.) Rydb.), Smooth Brome (*Bromus inermis* Leyss.), Water Sedge (*Carex* cf. *aquatilis* Wahl.), Spotted Water Hemlock (*Cicuta maculata* L.), Fringed Willowherb (*Epilobium ciliatum* Raf.), Baltic Rush (*Juncus balticus* Willd.), Alfalfa (*Medicago sativa* L.), Common Reed (*Phragmites australis* (Cav.) Trin. & Steud.), Dock (*Rumex sp.*), Ragwort (*Senecio sp.*), Broadleaf Cattail (*Typha latifolia* L.) and poorly developed mosses. Mallards were also seen swimming nearby.

Flowering Rush is the only species in the family Butomaceae.[4] It is especially easy to recognize when flowering (Fig. 2). Each flower has three pink petals and three pink sepals. The petals and sepals are poorly differentiated, with the sepals being slightly smaller than the petals and occasionally with a greenish tinge. The flowers have nine stamens and six pistils.[4] The plant grows in large clumps from rhizomes (Fig. 3). The umbels of large flowers (about 2-2.5 cm wide) are produced on upright, leafless stems. The basal leaves are 2-ranked, up to 1 cm wide, usually about 1 m long (up to 2.7 m) and triangular in cross section.[4, 13] The flowers mature into small dark, many-seeded follicles with long beaks (Figs. 4 &. 5). Flowering Rush reportedly flowers from June to August and is typically found in wetlands, growing in water up to 2 m deep although it can also be found growing completely underwater.[4, 6]

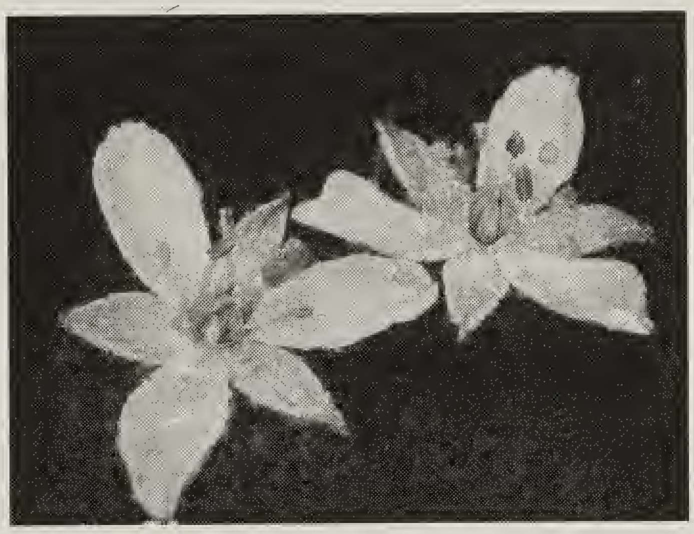


Figure 2. The flowers of Flowering Rush (non-Saskatchewan specimen)
Chris Eckert

Native to Europe and temperate Asia, Flowering Rush was first recorded in North America in 1897 near Montreal.[1, 10, 12] Flowering Rush has since spread to the northern United States and within Canada.[4]

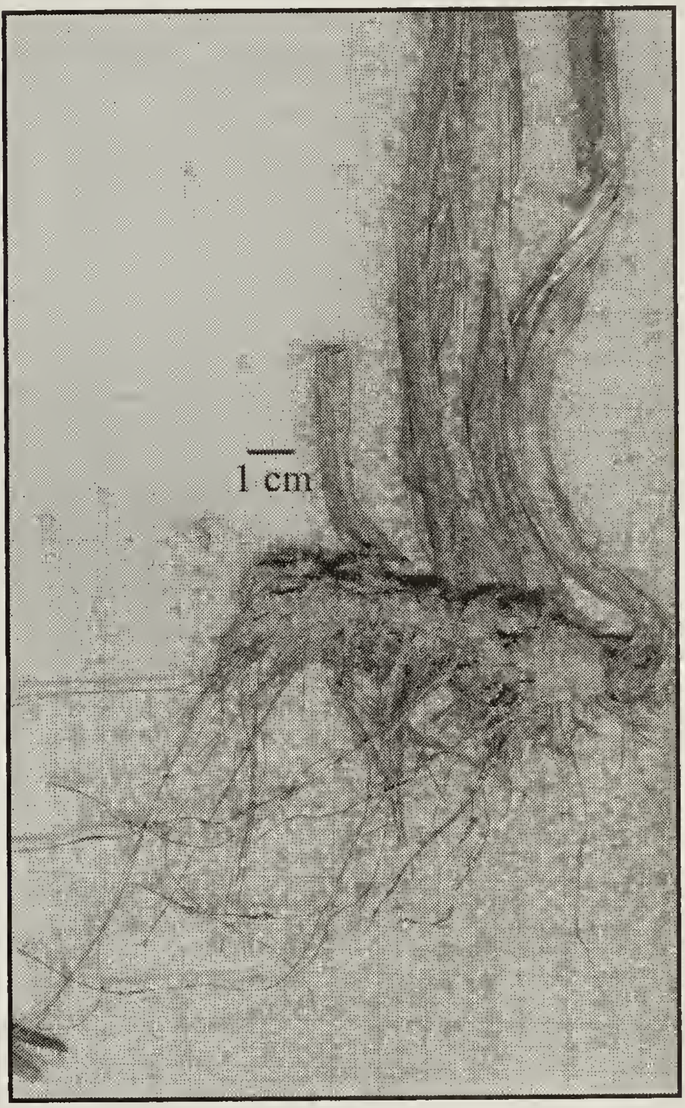


Figure 3. The rhizome and bottom part of the leaves of Flowering Rush Randy Olson

In Canada, Flowering Rush is most widespread in the east.[15] Sporadic populations have been found in the western provinces, including Alberta and Manitoba.[14, 15]

How the first Saskatchewan population was introduced is unknown. Flowering Rush is widely sold as an ornamental for planting in small-scale ponds, and may have escaped from cultivation. Some authors have speculated that long-range dispersal may

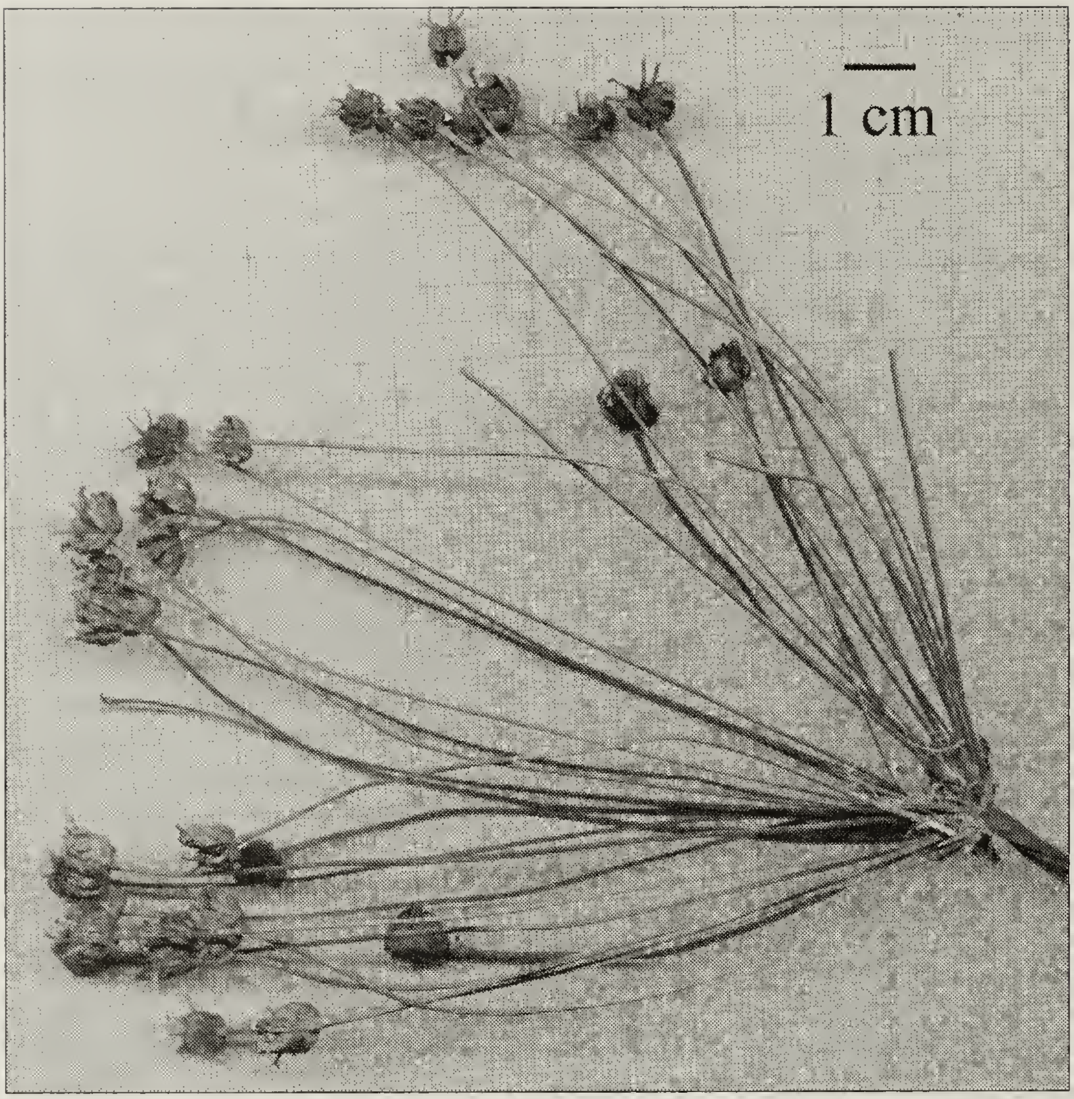


Figure 4. The umbel of Flowering Rush

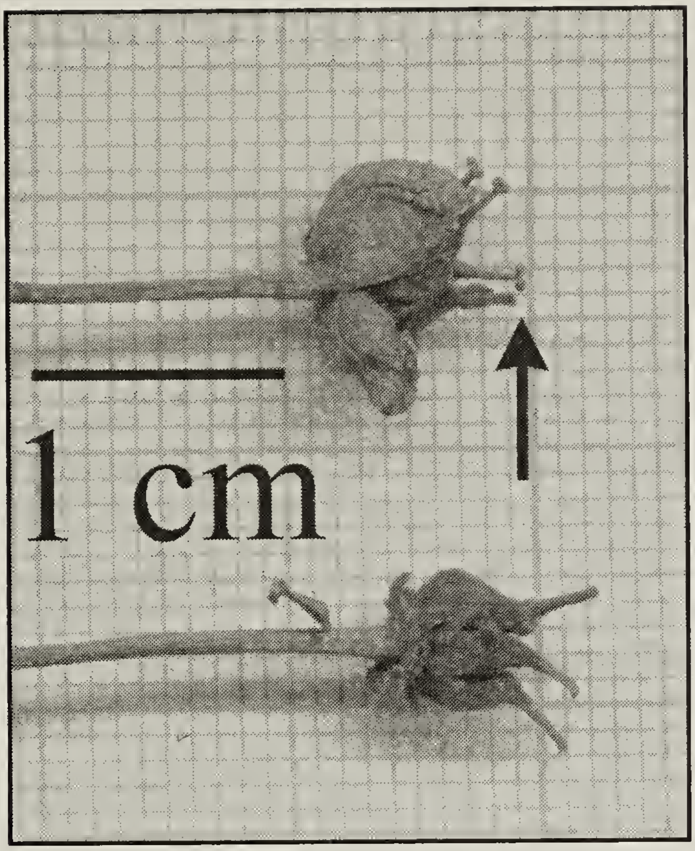
Randy Olson

occur via waterfowl.[14] Once established, Flowering Rush has been known to spread by rhizome fragmentation and through vegetative bulbils on the inflorescence and rhizomes.[2, 8, 14] This species also produces many seeds, which remain viable for at least 5 years.[2, 11] This wide range of reproductive methods appears to be a major part of this plant's ecological success.[2]

In northeastern North America, Flowering Rush is of major concern as an invasive weed and is being recognized as a potentially invasive species in other parts of the continent.[14, 15] Flowering Rush has been shown to be intolerant, but not completely so, to establishment in saline and brackish water.[5, 12] In the Prairie Provinces, Flowering Rush is expected to mainly threaten fresh water marshes.[15] The current threat of Flowering Rush to the prairies is fairly moderate in comparison to other species like Purple Loosestrife (*Lythrum salicaria* L.).[7] However, the biology of Flowering Rush and impact on native ecosystems have yet to be fully explored and there are some indications that the threat posed by Flowering Rush has been underestimated previously.[2]

Populations of Flowering Rush tend to be either diploid or triploid. Triploids rarely produce inflorescences or bulbils; they rely instead on highly branched rhizomes for reproduction.[9] Diploid populations present the greatest invasive threat when introduced into a new region because they produce many, highly viable seeds and bulbils.[2, 9] Interestingly, the bulbils apparently out-compete seeds for suitable sites for establishment as few plants growing from seed reach maturity.[3] Populations found well outside the normal range of Flowering Rush are usually triploids escaped from cultivation.[9] Examination of the material collected near Young revealed no bulbils on the rhizomes or inflorescences. Based on this, the population found near Young is likely an escaped triploid. However, ploidy levels from these plants have not been confirmed.

Many new populations of Flowering Rush appear to be the result of human introductions.[15] Early detection and monitoring of invasive species is crucial to



The fruits of Flowering Rush. The arrow points to one of the beaks of the follicles.
Randy Olson

ensuring that plant species do not become weeds that threaten native habitat. If you do see this plant, record its exact location and plant features, and report it to: The Saskatchewan Purple Loosestrife & Invasive Species Project (SPLISP) at 975-4101 (Saskatoon) or 1-877-281-3006.

For more information on Flowering Rush and other invasive species that threaten Saskatchewan go to http://www.sfn.saskatoon.sk.ca/science/splep/.

Acknowledgements
I would like to thank Allan and Linda Leslie for their cooperation and help. I would also like to thank Angela Salzl for her assistance in reviewing this article, Dr. Chris Eckert for advice and Figure 2, and Etienne Soulodre, whose report of this population made its early detection possible.

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ARBOREAL LICHENS ON A SAGEBRUSH BRANCH IN SOUTHWESTERN SASKATCHEWAN

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Introduction

The purpose of this paper is to document the occurrence of 15 lichen species growing on an isolated, dead and weathered branch of Hoary Sagebrush (*Artemesia cana*), a common shrub on open prairie.

The branch was approximately 37.5 cm long, with two small side branches, and averaged 7.5 mm in thickness (Figure 1). It was found on sparsely vegetated earth in lightly grazed native grasslands a few meters from live bushes of Hoary Sagebrush and Shrubby Cinquefoil (*Potentilla fruiticosa*). The site was estimated to be one km from Skull Creek to the west and Bridge Creek to the east, in E 2-10-22-W3. The area is about 22 km northeast of Cypress Hills East Block on predominantly native fescue prairie in the Mixed Grassland Ecoregion as part of the Prairie Ecozone (Map 1).[1] The branch was collected on June 13, 1999, during a field excursion to the Wolfater's ranch in conjunction with Native Prairie Appreciation Week.

The distribution of the lichens (indicated by the number at the end of each description below) is shown in Figure 1, and the following annotated list summarizes these lichens. The lichens have been identified by the author, and scientific names and authors follow Esslinger.[9] Vernacular names are those of Brodo *et al,* and Goward.[3, 10]

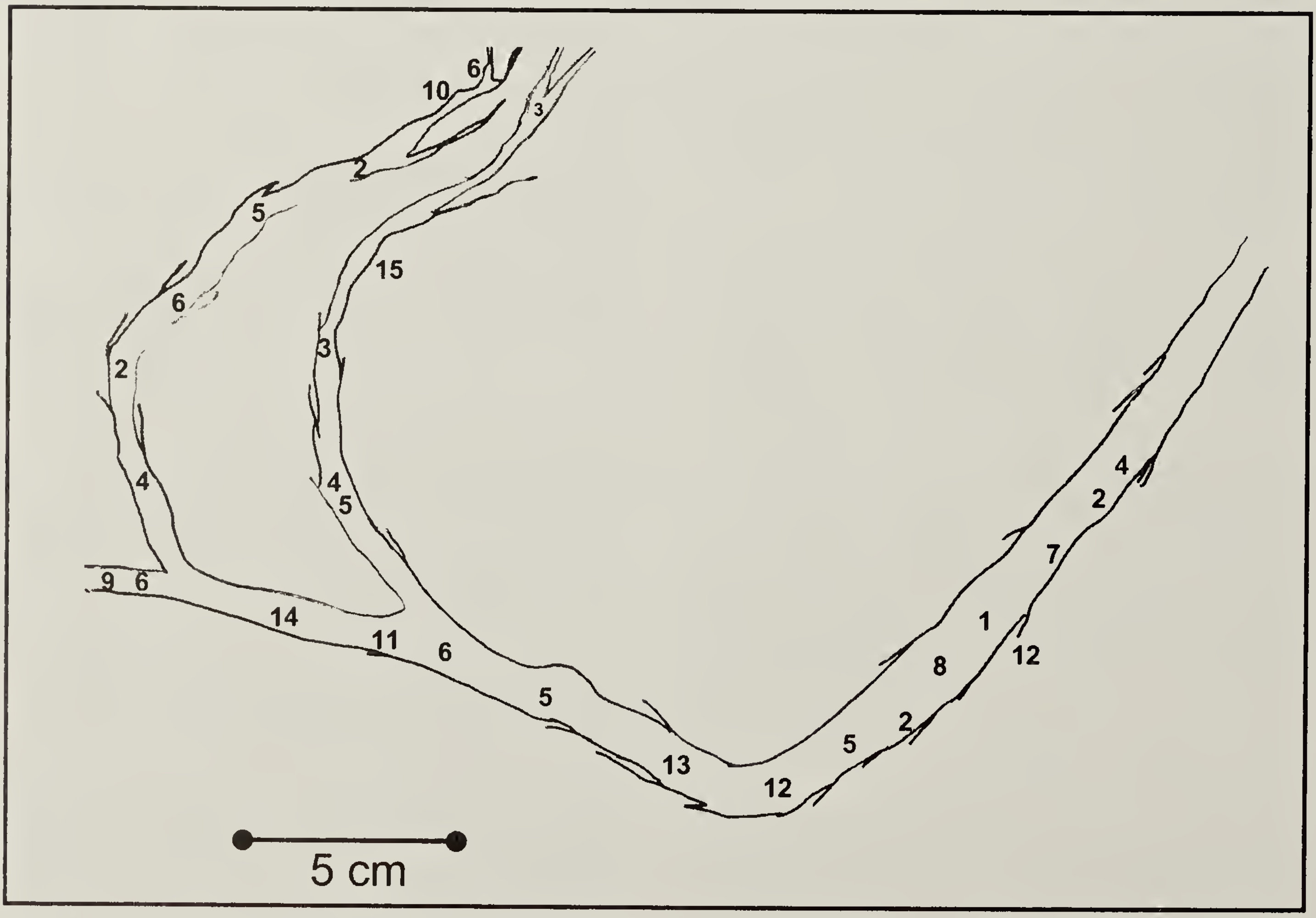


Figure 1. Sagebrush branch showing the locations of lichens referred to by numbers given in the annotated list.

Annotated Lichen List

Amandinea punctata (Hoffm.) Coppins and Scheid. (Tiny button lichen). Found twice on shreddybark as small specimens. This species ranges widely throughout North America, occurring on various types of bark and wood. (#12)

Bryoria simplicior (Vainio) Brodo and D. Hawksw. (Spangled horsehair lichen). Found once with *Physcia adscendens* on the upper bark. The species is northern boreal in distribution, but is also recorded for the Cypress Upland Ecoregion.[6,11] (#14)

Hypogymnia austerodes (Nyl.) Raesaenen (Varnished tube lichen). Found once on weathered wood terminating a side branch. This lichen has been recorded for the Cypress Upland Ecoregion in southwestern Saskatchewan.[3] (#10)

Hypogymnia physodes (L.) Nyl. (Monk's-hood lichen). Found in four separate locations on the upper bark, where it is associated with *Parmeliopsis hyperopta* (Gray starburst lichen) in one location only (Figure 1). It is one of the most common and widespread tree lichens in the boreal forest, extending southward into the montane coniferous forest. It is considered rare in the Aspen Parkland but occurs in the Cypress Upland Ecoregion.[3,11] (# 6)

Lecanora pulicaris (Pers.) Ach. (Black-eyed rim-lichen). A small arboreal crustose lichen found once on shreddy bark. The species occurs throughout the boreal forest and has been recorded for the Aspen Parkland and Cypress Upland ecoregions as *Lecanora coilocarpa* (Ach.) Nyl.[2,12] (# 7)

Lecanora symmicta (Ach.) Ach. (Fused rim-lichen). This small, tree-dwelling crustose lichen was found once on upper shreddy bark. The species is widespread in the boreal forest and its preference for open locations fits the discovery site. It has been recorded for the Cypress Upland Ecoregion.[3,12] (#13)

Melanelia exasperatula (Nyl.) Essl. (Lustrous camouflage lichen). Found only once on upper bark. The species occurs in all ecozones and has been recorded for the Cypress Upland Ecoregion.[3,6] (#1)

Parmelia sulcata Taylor (Hammered shield lichen). Distributed over the upper side of the first side branch in three scattered locations in association with *Physcia aipolia*, (Hoary rosette lichen). The species is widespread in all four ecozones and is a pioneer species on various substrates.[3,5] (# 4)

Parmeliopsis hyperopta (Ach.) Arnold (Gray starburst lichen). Found only once on the upper bark, where it is associated with *Hypogymnia physodes* (Monk's-hood lichen). It is found in the northern boreal forest (Taiga and Boreal Shield ecozones) and scattered in the Aspen Parkland. It also occurs in the Cypress Upland Ecoregion.[3,11] (#9)

Physcia adscendens (Fr.) H. Olivier (Hooded rosette lichen). Scattered over shreddy bark in four locations. This common species ranges throughout all four ecozones including the Cypress Upland Ecoregion,[6] and is commonly found on bark of a variety of trees or tall shrubs. It has been found on mature Manitoba Maple (*Acer negundo* var. *interius*) and Balsam Poplar (*Populus balsamifera*) in prairie coulees and ravines as well as in the Aspen Parkland.[3,4,7,8] (#2)

Physcia aipolia (Ehrh. ex Humb.) Fuernr. (Hoary rosette lichen). Found scattered on the upper branch in four locations and once in association with *Parmelia sulcata* (Hammered shield lichen). Commonly found in all ecozones on bark and wood of various trees and tall shrubs preferring open locations. It has been recorded for prairie coulees on mature trees and for the Aspen Parkland as well as the Cypress Upland Ecoregion.[3,4,7,8] (#5)

Usnea hirta (L.) F.H. Wigg. (Bristly beard lichen). Found once as a fairly large specimen on the upper and weathered terminal main branch. This is a common species ranging throughout all four ecozones and in the Cypress Upland Ecoregion.[5,6] It is typically found on hard, weathered wood such as old fence posts or boards.[3,4,6] (#11)

Usnea substerilis Mot. (Embossed beard lichen). Found as a very small immature specimen on shreddy bark. The species has been recorded for the northern and central boreal forest, and the Cypress Upland Ecoregion.[6,11] (#15)

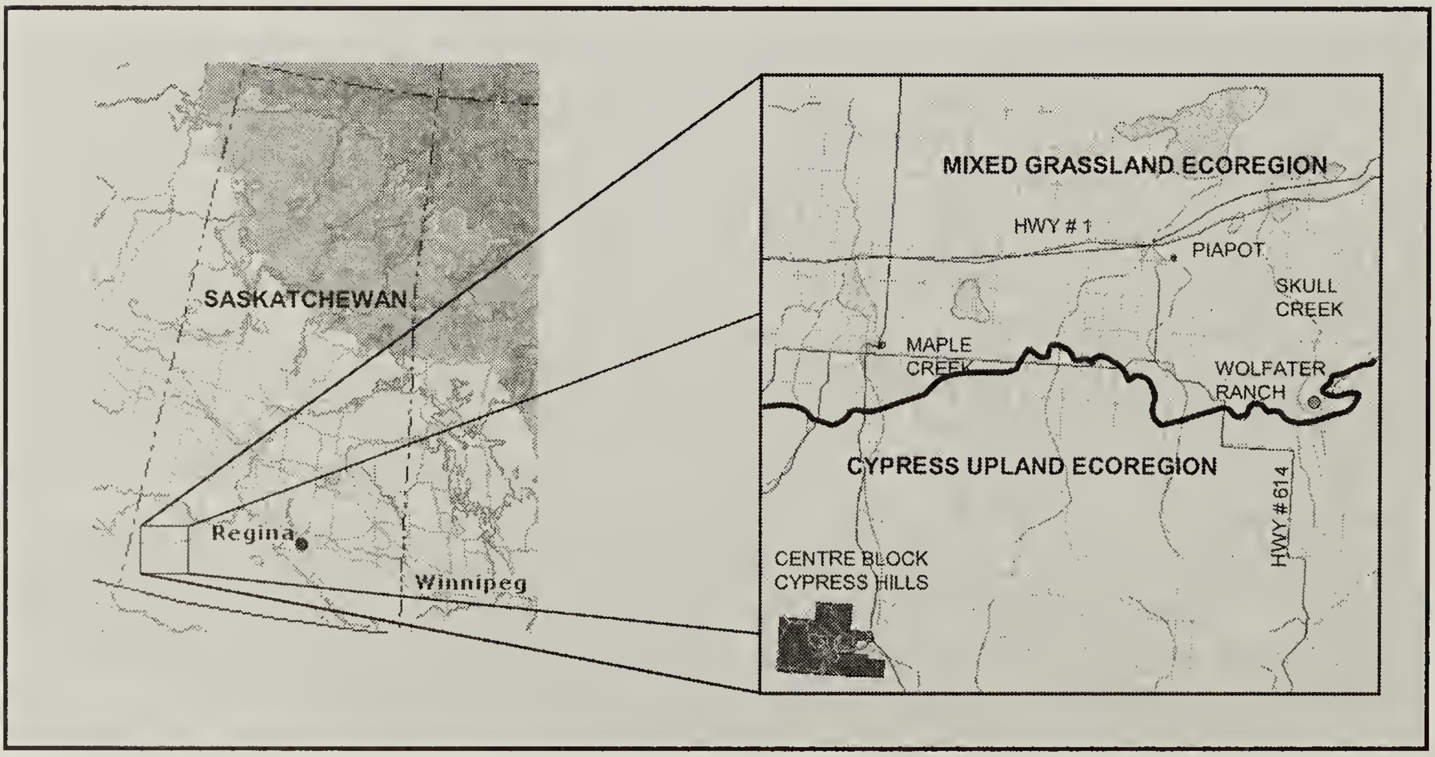
Xanthoria hasseana Raesaenen (Poplar sunburst lichen). Found twice as small specimens on an upper terminal branch. This lichen has been recorded across central and southern regions with no records to date from Cypress Upland Ecoregion.[3] (#3)

Unidentified crustose species found once on shreddy bark. (#8)

Discussion

Lichen diversity on alive or dead, attached or isolated branches or twigs, is not uncommon in forested areas. This particular branch showed an unusual diversity of lichens with a boreal affinity found in all ecozones (with the exception of *Bryoria simplicior*, *Hypogymnia austerodes*, *Lecanora pulicaris*, and *Xanthoria hasseana*). Unfortunately time did not permit a survey of other Hoary Sagebrush or other shrubs in the immediate vicinity for other occurrences of these lichens, nor to investigate the two creeks for possible arboreal lichen on trees. The author has not found these particular lichens previously on Hoary Sagebrush, and considers their presence at this locality to be rare, although future surveys of Hoary Sagebrush might prove otherwise.

How these lichens arrived at this particular location and branch is difficult to answer. Assuming that the entire branch with lichens was not transported to the site by physical or mechanical means (cattle, farm implements, strong winds, persons), the most likely explanation would be that they were transported by recent aerial fragmentation from the east end of the Cypress Upland Ecoregion or the adjacent wooded prairie coulees as the nearest dispersal sources. The fact that these lichens did not form well integrated communities, such as those found on well established



Map 1. Location of the sagebrush collection site

locations on mature tree bark, but occurred mostly singly, suggests recent colonization of the branch. The lichens are quite small, not exceeding 1 to 2 cm in diameter, suggesting slow growth under a more dry climatic regime than found in the boreal forest. An exception is *Usnea hirta* (Bristly beard lichen) which measured about 4.5 cm in diameter.

Acknowledgements

The Author is much indebted to Robert A. Wright, Plant Ecologist, Saskatchewan Environment for his interest in this paper, and many helpful suggestions, as well as preparing the figures. Thanks are also due to my wife Irma for her enthusiastic assistance in fieldwork, support and encouragement in preparing the manuscript.

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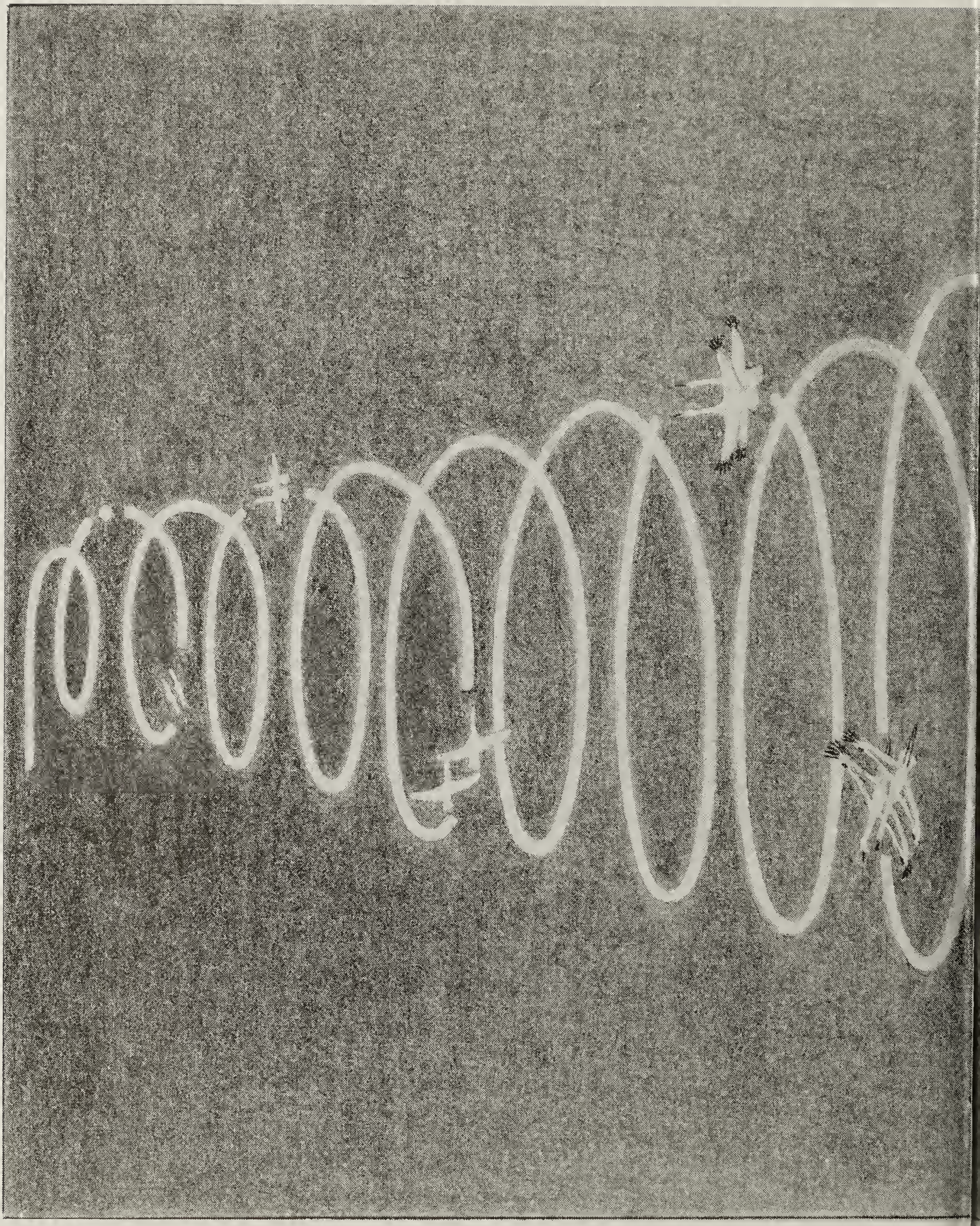
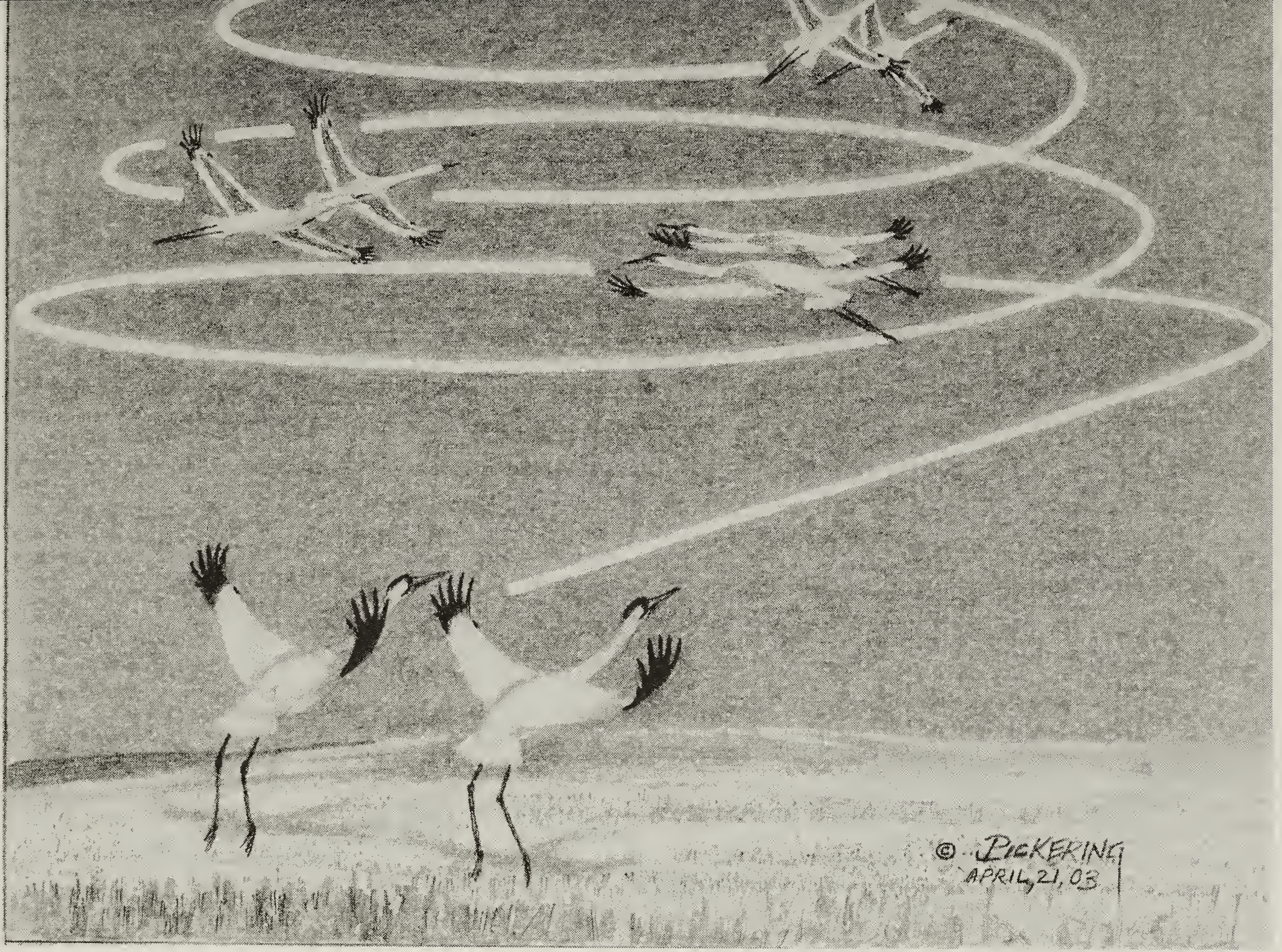
* * *

"*Xanthoparmelia chlorochroa* has proved to be a reliable indicator of excellent antelope habitat and has been used as such by wildlife managers reintroducing antelope to certain areas in the Great Basin. The lichen is eaten by antelope and is especially important in early spring and under drought conditions. *Xanthoparmelia chlorochroa* is highly prized by the Ramah Navajo of New Mexico, and by craftspeople in other parts of the west, as a source of boiling-water dyes for reddish brown colors." Brodo, Sharnoff and Sharnoff, *Lichens of North America*, p. 734





The spiral flight of two Whooping Cranes (see article on page 84)

INSECTS

EIGHT NEW OR PREVIOUSLY UNRECORDED SPECIES OF ODONATA (DRAGONFLIES) FOR SASKATCHEWAN

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Since 1998, I have been spending part of each summer surveying the dragonfly fauna of Saskatchewan. Dragonflies are a relatively small order of insects consisting of approximately 5000 species worldwide.[2,8,9] Five years ago, the checklist of Saskatchewan dragonflies numbered 62 recognized species.[7] Eight species have been added to the list, some expected, some not, and here I present the collection locations and dates, as well as some comments on distribution for each. Common names are from a checklist of North American Odonata.[6]

The eight new species are *Aeshna subarctica* - Subarctic Darner, *Aeshna tuberculifera* - Black-Tipped Darner, *Basiaeschna janata* - Springtime Darner, *Stylurus notatus* - Elusive Clubtail, *Somatochlora walshii* - Brush-Tipped Emerald, *Somatochlora williamsoni* - Williamson's Emerald, *Leucorrhinia patricia* - Canada Whiteface, and *Sympetrum semicinctum* - Band-Winged Meadowhawk. Two of the species that were collected in 2001 and 2002– *Aeshna subarctica*, and *Leucorrhinia patricia*–were previously documented, but the records were not known to the general odonatological community. Information on *Stylurus notatus*, a species known only from a previous collection, is included here as well.

All specimens referred to were collected by myself except where otherwise noted. The specimens are currently housed at the Royal Saskatchewan Museum with duplicates of the 2001-2003 collections in my personal reference collection in Victoria, B.C.

It should be borne in mind that a species list is always a work in progress, setting a benchmark for more comparisons with future collecting, especially in hard-to-reach regions of the province. The list will surely change as more people become involved in dragonfly collecting and observations.

Aeshna tuberculifera Walker - Black-Tipped Darner (Fig. 1)

Aeshna tuberculifera was first recorded in Saskatchewan, August 3-12, 2002, in the Cantara Lake area of Athabasca Sand Dunes Provincial Wilderness Park (ASDPWP), where it was flying in large numbers and, at times, was the third most common dragonfly on the wing.[5] On August 24, 2003, two males that were patrolling over a small sedge pond in the Canwood Forest area north of Shellbrook, were collected.

This species was not suspected of occurring in the prairie provinces as the previous records are from south-central British Columbia and extreme southeastern Manitoba (Fig. 2).[1,2,3] This uncommon dragonfly of peat-margined waters is most likely to be found more extensively over time. Nick Donnelly, past president and

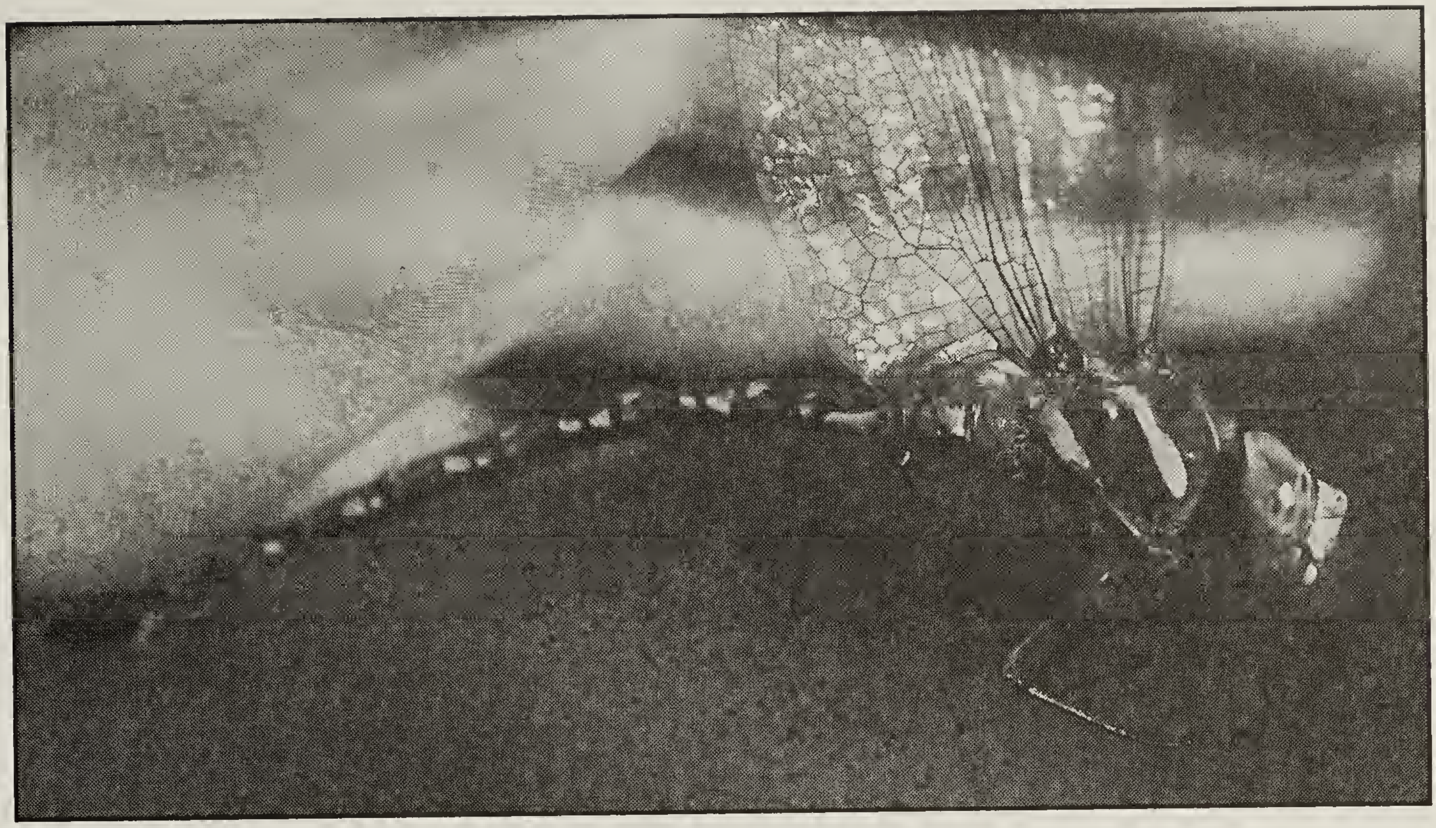

Figure 1. **Aeshna tuberculifera** *in the hand* *G.E. Hutchings*

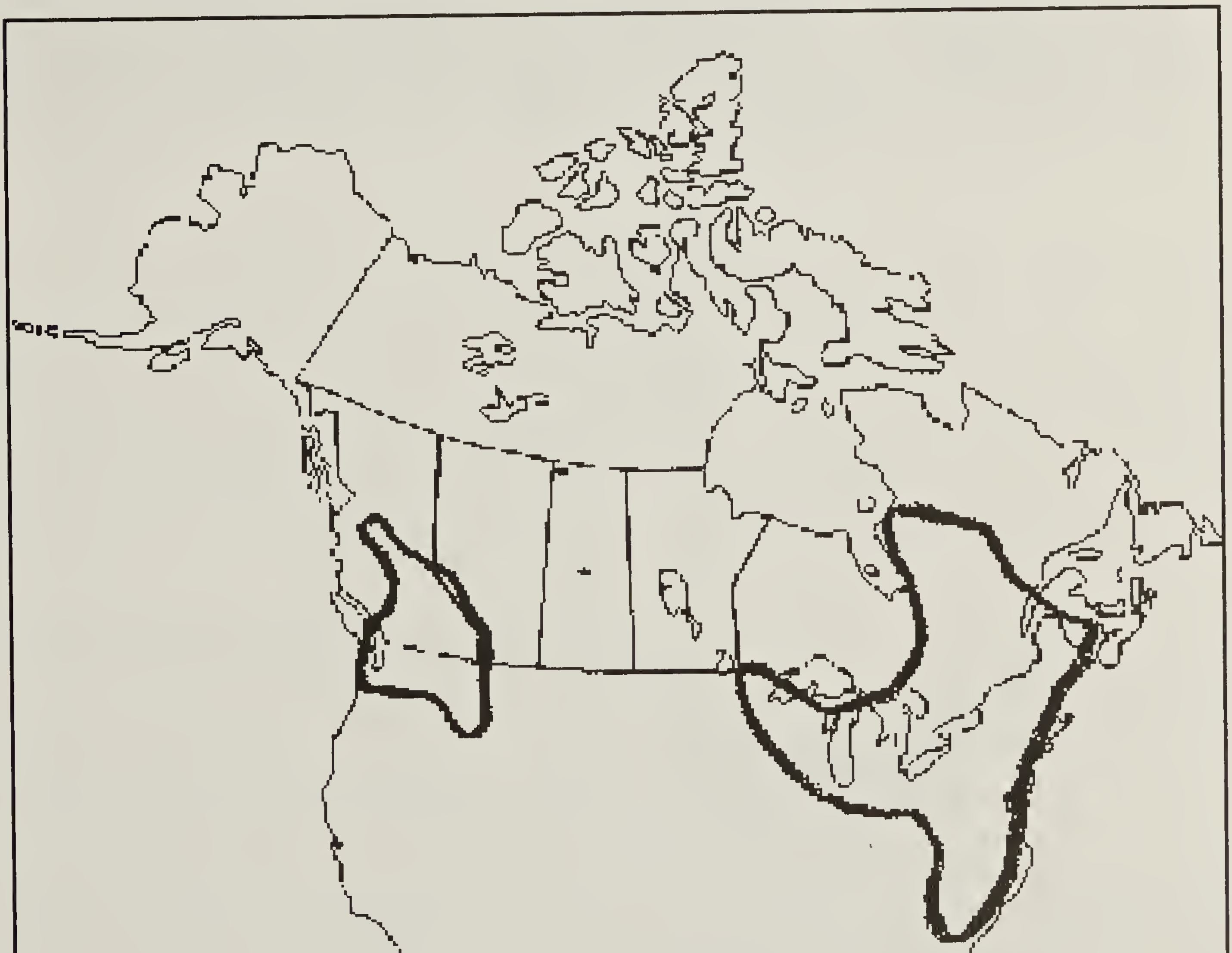

Figure 2. Areas within thick dark lines are the former reported range for **Aeshna tuberculifera** *in North America and the two rectangles in Saskatchewan are new collecting sites in Saskatchewan*

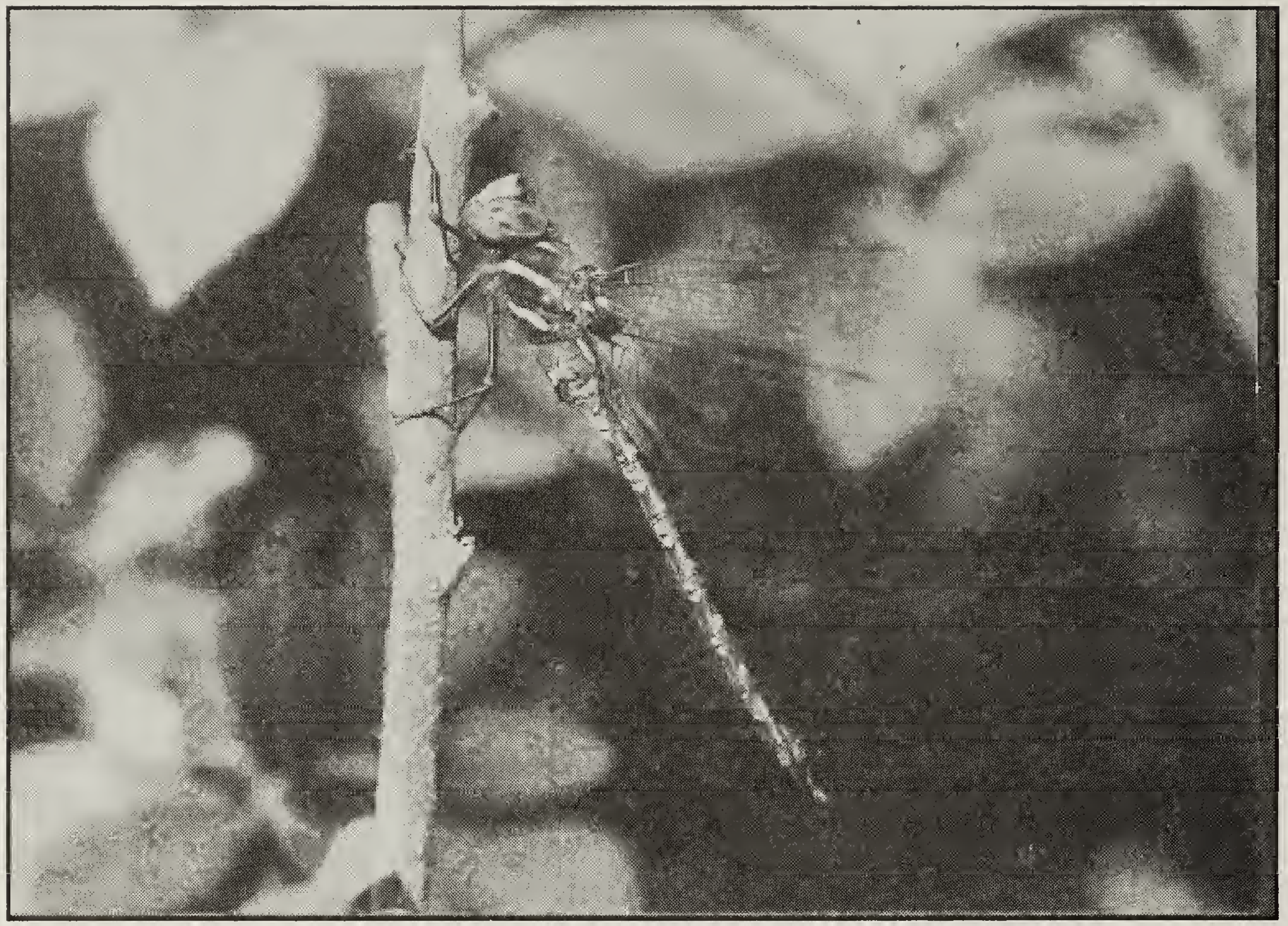

Figure 3. A perching male **Basiaeschna janata** *S.W. Dunkle*

distinguished member of the Dragonfly Society of the Americas, says of this discovery: "*Aeshna tuberculifera* is a good example of a species that looks like it has an eastern and a western population - simply because of few data in the middle. I think that it is continuous across the country, but very undersampled."(Nick Donnelly, pers. comm.).

Basiaeschna janata **(Say) - Springtime Darner** (Fig. 3)

On 30 June, 2001, while working on an insect survey of Prince Albert National Park (PANP), I collected a hawking male *B. janata*, feeding amongst several other dragonflies at a rich fen bordering a pond in the middle of the park, on the west side of Waskesiu Lake.[4] Two days later, a female was collected from Waskesiu River which flows out of the east side of Waskesiu Lake.

This new record in Saskatchewan is a range extension north and west of some 800 km as the "dragonfly flies" (Fig. 4). These two sites were directly across Waskesiu Lake from each other at 53° 57' N, 106° 14' W, about 1° north and 8° west of previous records near the extreme southern border of Manitoba and Ontario. The nearest known site for this species is from east of the town of Lac du Bonnet, Manitoba, on June 5, 1982 (Dennis Paulson, pers. comm.).

Another *B. janata* was collected on June 19, 2002 at Candle Lake 53° 46' N, 105° 15' W. (Dale Parker, pers. comm.).

Somatochlora walshii **(Scudder) - Brush-Tipped Emerald**

A female was collected on July 2, 2001 in a large fen complex just west of the limits of PANP near Listen Lake (54°18' N, 106° 51' W).[4] Although this species is known from both neighbouring Alberta and Manitoba, only one female was found here. This record fills in a large distribution gap, but more specimens should be encountered in the future.

Somatochlora williamsoni **Walker - Williamson's Emerald** (see back cover)

This species was collected on July 7, 2001 at Buckland Bog, 4 km west of Prince Albert (53° 11' N, 105° 56' W) and again on July 14, 2001 at Kingsmere Lake PANP (54° 02' N, 106° 25' W). A healthy population of *S. williamsoni*, with many actively patrolling males, ovipositing females and copulating pairs, was observed seeking refuge from the wind on an open edge of this lake. Back in PANP on August 9, 2001, a lone, hawking male *S. williamsoni* was collected at Kingsmere Lake at 54° 02' N, 106° 25' W.

On August 21, 2002, this species seemed to be doing well at the Buckland Bog site where many individuals were frequenting this same spot. Also on August 21 at Boundary Bog in PANP, 53° 54' N, 106° 02' W, many males were patrolling over the open water of the small lake, and there were a few ovipositing females. Previous visits to this site in PANP since 1997 never produced this species so it appears to be extending its range northward. This dragonfly species was previously known only as far west as the Manitoba/Ontario border country, with very limited distribution as far west as Winnipeg Beach and Gull Lake, Manitoba (Fig. 4).[3]

Sympetrum semicinctum **Walker - Band-Winged Meadowhawk**

A mating pair was captured on August 9, 2003 from the forested edge of the fen complex at MacDowell Bog, south of Prince Albert at 52°58' N, 106° 05' W. This species, which is sometimes referred to as two distinct species, *S. occidentale* and *S. semicinctum*, is known to occur in adjacent southern Alberta and northern North Dakota. Its range stretches east and west, coast to coast. It was expected from southern Saskatchewan and this record fills in a distribution gap.

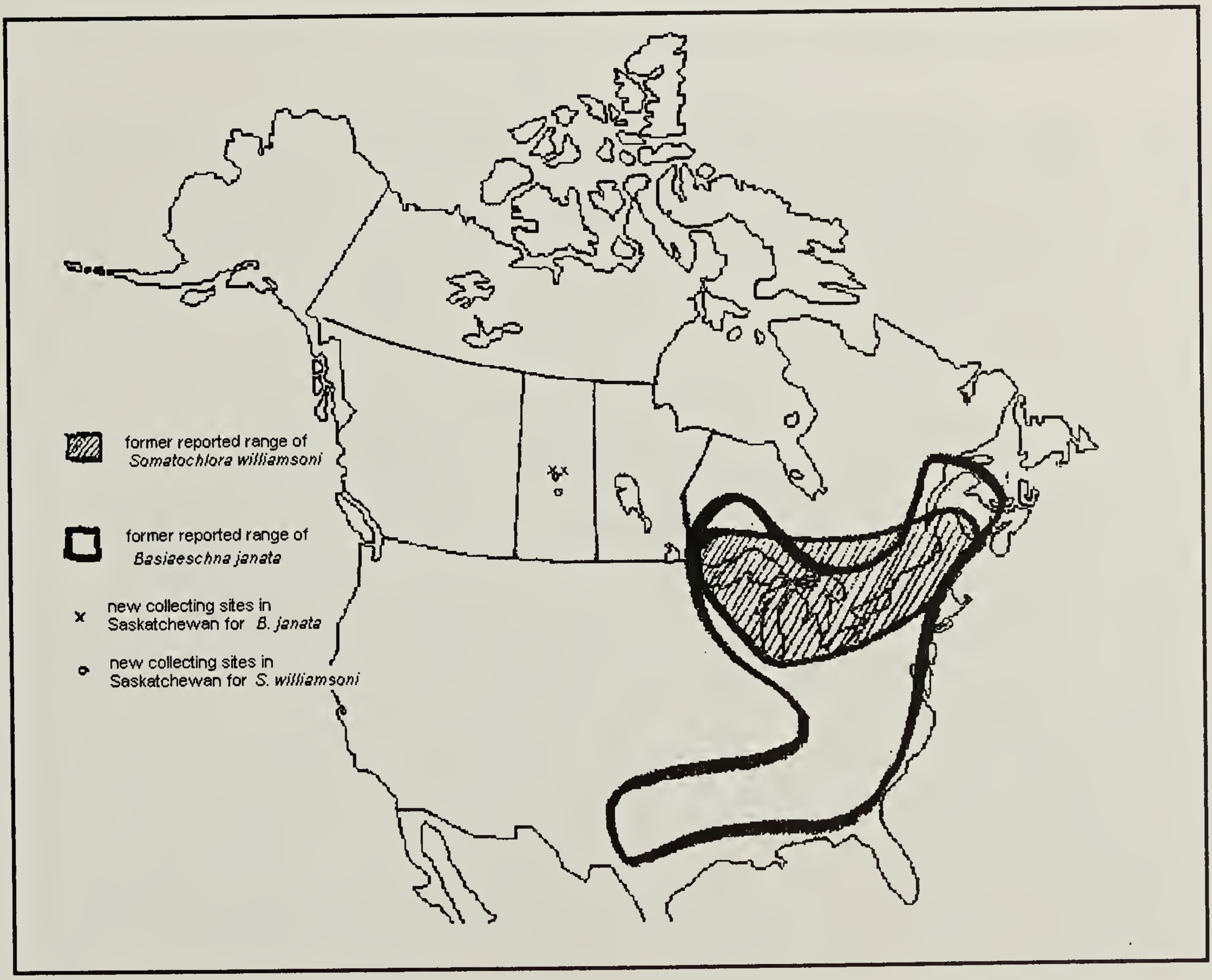
▨ former reported range of *Somatochlora williamsoni*
☐ former reported range of *Basiaeschna janata*
x new collecting sites in Saskatchewan for *B. janata*
● new collecting sites in Saskatchewan for *S. williamsoni*

Figure 4 Former reported range for **Basiaeschna janata,** ***and*** **S. williamsoni** *in North America and new collecting sites in Saskatchewan*

***Aeshna subarctica* Walker- Subarctic Darner** (Fig. 5)

This species was first collected by Ron Hooper on July 13, 1964 at Black Lake. It was again collected from Upper Fishing Lake in Narrow Hills Provincial Park on August 4, 1975 by Wayne Harris (Ron Hooper pers. comm.). In 2001, I collected it at four locations: Buckland Bog, 4 km west of Prince Albert at 53° 11' N, 105° 56' W on August 19; a fen in the Canwood Forest, 5 km north of Shellbrook at 53° 19' N, 106° 31'16 W on August 21; Boundary Bog in PANP, 53° 54' N, 106° 02' W on August 23; and a series of small fens on the west side of Waskesiu Lake at 53° 57' N, 106° 14' W on August 24.

In 2002, several specimens were collected from ponds and fens around Cantara Lake in ASDPWP, 59° 06' N, 108° 57' W, between August 3 and 12. On August 9, 2003 a male was recorded from the open pools in MacDowell Bog south of Prince Albert at 52° 58' N, 106° 05' W. The Canwood Forest site was revisited on August 24, 2003 where again this species was flying. It is known from every other province, the Yukon and North West Territories, and was definitely expected from this province. It appears that this species is widespread and a common occurrence especially in northern Saskatchewan, based on its known fen and bog habitat

***Stylurus notatus* (Rambur) - Elusive Clubtail**

Ron Hooper collected one adult male from the Frenchman Butte area, northeast of Lloydminister, on July 13, 1971 (Ron Hooper pers. comm.). This location near the North Saskatchewan River is a typical habitat for this species which prefers wide, slow-moving large rivers. Previously this species was known to extend only as far west as western Manitoba, so this record is a substantial range extension for North America.

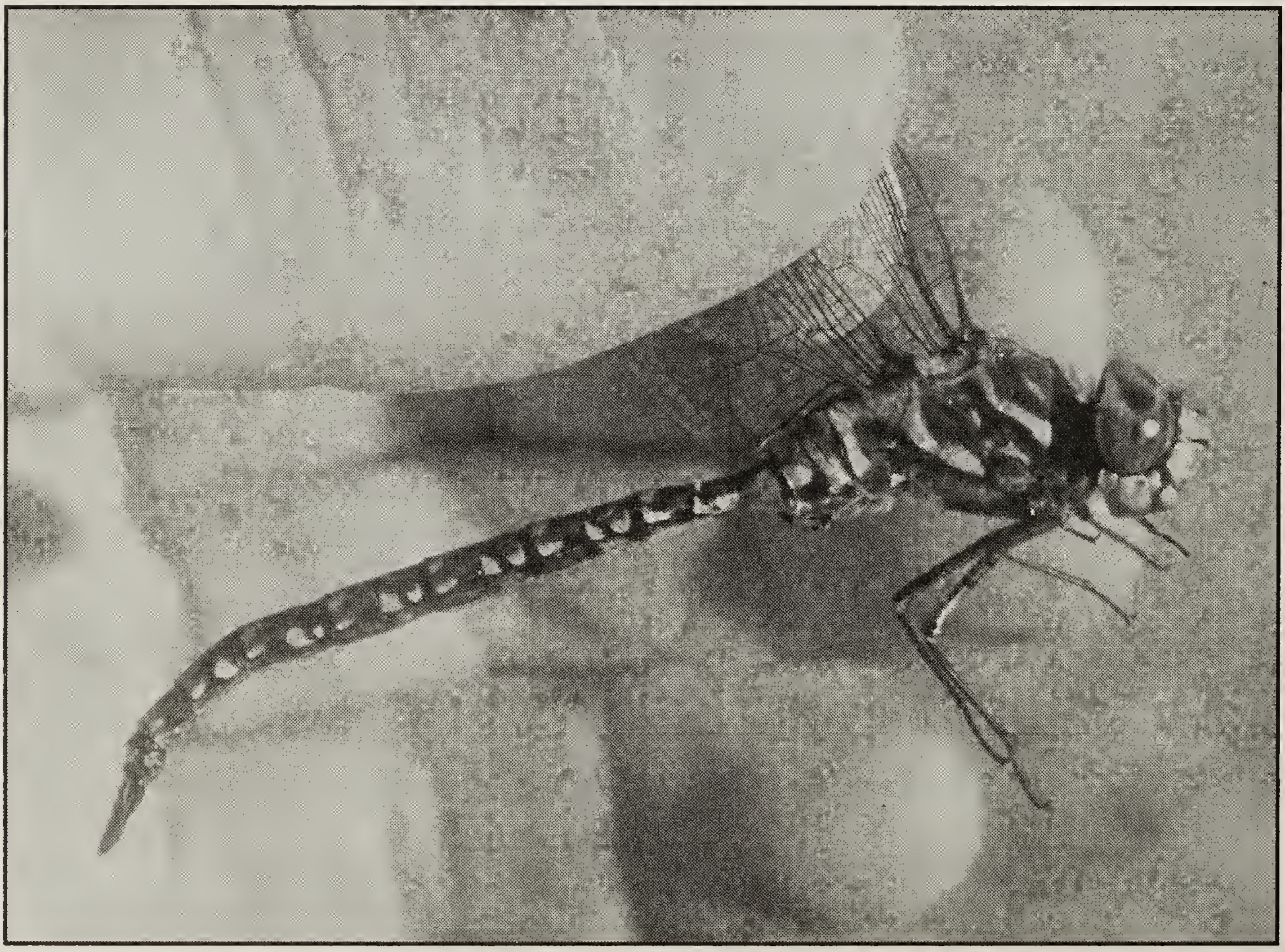

Figure 5. **Aeshna subarctica** *in the hand* *G.E. Hutchings*

***Leucorrhinia patricia* Walker - Canada Whiteface**

This boreal species was first recorded in Saskatchewan from Charcoal Lake, just east of Wollaston Lake on July 24, 1964 by Ron Hooper. Additional specimens were collected from Patterson and Hasbala lakes in the extreme northeast corner of the province straddling the N.W.T. and Manitoba borders in 1973, 1975 and 1986, as well as from La Ronge in 1982, all by Ron Hooper (Ron Hooper pers. comm.).

Recently this species was found at a fen complex surrounding Cantara Lake of ASDPWP at 59° 07' N, 108° 55' W, from August 4 to 12, 2002. This species is found in sparse numbers in northern bogs right across Canada and this record for Saskatchewan fills in the distribution gap.

Acknowledgments

I thank Ron Hooper for his historical records for *Aeshna subarctica*, *Stylurus notatus* and *Leucorrhinia patricia* and his support in submitting this article to *Blue Jay*; Dennis Paulson, Dale Parker, J. Hamblin and Nick Donnelly for information on the distribution of *Basiaeschna janata* and *Aeshna tuberculifera;* Dr. Sid Dunkle for use of his photos of *B. janata* and *S. williamsoni;* Peter Jonker for his comments on the draft and Rob Cannings for confirming the identification of the specimens.

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"In countries ranging from Peru to New Guinea, figs are a critical resource for a wide variety of animals in tropical forest communities – from bats and primates (including people) to parrots and birds of paradise. Up to 70 percent of vertebrate diets in certain forests is derived from figs. There are more than 750 different fig species in the world, and the majority of them rely on different species of tiny wasps as their exclusive pollinator."

Stephen L. Buchmann and Gary Paul Nabhan, *The Forgotten Pollinators*, 1996. p. 58

SASKATCHEWAN MOSQUITOES AND WEST NILE VIRUS

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West Nile virus and wild birds

West Nile virus (WN) is a virus of wild birds, transmitted from bird to bird primarily by mosquitoes. Native to southern Europe, the Middle East and Africa, the virus arrived in North America in 1999 and spread quickly across the continent. Over 225 species of birds have been reported as infected with WN; some of these species, such as members of the crow family, suffer severe disease and often die from WN infection, while others appear to tolerate infection without becoming ill. The American Crow, Black-billed Magpie, Blue Jay and Common Raven, are used as indicator species because their high and rapid death rates allow the spread of the virus to be monitored.

West Nile virus and mosquitoes

Some species of mosquito feed almost exclusively on birds, some feed mainly on mammals, and a few feed readily on both birds and mammals. During spring and summer, bird-feeding species of mosquito spread WN from bird to bird, and there is a gradual increase, or amplification, in the amount of virus circulating in birds and mosquitoes from the beginning to the end of the mosquito season. Mosquitoes thus act as 'vectors' of the virus, moving it between individual animals. Mosquito species that feed on both birds and mammals, and which often feed more than once as adult females, are capable of feeding first on an infected bird and then on a mammal, thereby passing the virus from the bird to the mammal. Even though the virus does not grow well in mammals and there is seldom enough virus in a mammal's blood stream to infect mosquitoes that feed on them, some mammals, including horses and humans, can become ill from WN infection.

Many mosquitoes, including most *Anopheles*, *Culex* and *Culiseta* species, have several generations a year, and almost all of them over-winter as mated but unfed adult females.

Although mosquitoes generally become infected by taking blood from an infected bird, the presence of the virus in a few over-wintering females that had not taken their first blood meal suggests that the virus can pass directly from the female mosquito to the eggs. If a mosquito infected with WN is able to pass WN to its eggs, then at least some of the adult mosquitoes that develop from those eggs will be infected and able to infect birds or mammals when they seek their first blood meal. The virus may multiply to a greater or lesser extent in infected mosquitoes between blood meals and this, together with the biology of the species, make some species more competent vectors, or virus carriers, than others.

Capacity of Saskatchewan mosquitoes as vectors of West Nile virus

In North America, 49 species of mosquitoes have been shown to carry WN. *Culex* species have been the mosquitoes most commonly infected with WN.[5] Physiological and ecological characteristics of *Culex* species support the role of these mosquitoes in maintaining WN in nature.

Seventeen species of Saskatchewan mosquitoes, belonging to the genera *Culex, Culiseta, Aedes, Ochlerotatus, Anopheles*, and *Coquillettidia*, have been shown to be infected with WN in other states or provinces. However, only a few of these species appear to have a high capacity as vectors that transmit the virus from bird to

Table 1. Vectorial capacity* of WN positive mosquitoes known to occur in Saskatchewan [1,4,9]
(Cx.=Culex; Cs.=Culiseta; Ae.=Aedes; Och.=Ochlerotatus; Ano.=Anopheles; Coq.=Coquillitidia)

Species	Ecozone or Ecoregion	Host Preference	Vector Role		Vectorial[1] Capacity
			Bird-to-bird	Bird-to-mammal	
Cx. tarsalis ** (2)	prairie/parkland	Birds, mammals	++	+++	+++
Cx. restuans ** (2)	prairie/parkland	Mostly birds	+++	++	++
Cx. territans (2)	prairie/parkland/boreal	Frogs, reptiles?			
Cs. inornata ** (2)	prairie/parkland/boreal	Mostly mammals, occasionally birds		++	++
Ae. vexans (3)	prairie/parkland	Mammals		++	++
Ae. cinereus (3)	Parkland/boreal	Mammals, birds?			
Och. canadensis (3)	parkland	Mammals, general feeder			+
Och. dorsalis (3)	prairie/parkland	Mammals, occasionally birds		++	++
Och. fitchii (3)	prairie/parkland/boreal	Mammals			
Och. nigromaculis (3)	prairie	Mammals			
Och. provocans (3)	parkland/boreal	Mammals			
Och. sticticus (3)	prairie/parkland	Mammals			
Ano. Earlei (2)	prairie/parkland/boreal				
Ano. walkeri (4)	prairie/parkland/boreal				
Cs. morsitans (2)	parkland/boreal	Birds, mammals			
Cs. Impatiens (2)					
Coq. perturbans (5)	parkland/boreal	Birds, mammals, general feeder			+

* Vectorial capacity includes vector competence and also adjusts for population size, feeding habits, lifespan, etc. Vector competence refers to the ability of a species to transmit a pathogen.

** WN virus isolations obtained in 2003 from Saskatchewan

1 Vectorial capacity is rated as follows: 0=incompetent, +=inefficient, ++=efficient, +++=moderately efficient and ++++=extremely efficient. If cell is blank, vectoral competence is unknown.

2 Females overwinter, several generations per year

3 Eggs overwinter, one or two generations per year

4 Eggs overwinter, several generations per year

5 Larvae overwinter, one generation per year

bird or from bird to mammal with regularity (Table 1)

Culex tarsalis is believed to be the principal transmitter of WN to humans in Saskatchewan due to its multivoltine reproduction (multiple generations per season), regular habit of taking more than one blood meal, and willingness to feed on both birds and mammals. This last trait makes it Saskatchewan's most important 'bridge" vector, moving WN outside its normal bird-to-bird cycle of infection to one including people.

There is evidence in some *Culex* species, including *Culex tarsalis*, of vertical transmission from parent to offspring as evidenced by infected males (males do not take blood meals). Such transmission through eggs may explain how WN infects so many vector mosquitoes so rapidly during the mosquito season (*Culex tarsalis* has several generations a year), and also how the virus may survive the winter (*Culex tarsalis* overwinters as a mated adult female).

Culex restuans is a competent bird-to-bird and bird-to-mammal vector for WN, but it has not been a common species of mosquito in Saskatchewan over the last decade. Historical records of *Culex restuans* show only a sporadic occurrence of this species, with low numbers collected at Weyburn, Outlook, Saskatoon and Melfort. However, a survey of water-filled tires and catch basins in 2003 revealed that this species is probably more widespread than previously thought, particularly in parkland areas. This species and *Culex tarsalis* are probably the principal species infecting and amplifying the virus in birds. *Culex restuans* seems to prefer bird hosts, and feeds only occasionally on mammals, snakes and turtles. Thus its role as a vector of infection for humans is small.

Another species of *Culex, Culex pipiens,* is the species suspected of being the main vector in many urban areas of southeastern Canada and the United States. This species has not been recorded in Saskatchewan. The distribution of *Culex pipiens* includes southern Ontario and Quebec as well as southern B.C. (Belton, P., 2004. pers.comm.).

Culiseta inornata may be a significant transmitter of WN from birds to horses late in the summer season (Lindsay, R. 2003. pers. comm.). However, its preference for the blood of larger mammals and its reluctance to take more than one blood meal make virus transmission by this species to humans or other animals relatively rare.

WN infection in *Ochleratatus dorsalis* and *Aedes vexans* has been less frequent than in *Culex* spp. or in *Culiseta inornata*, but these species are usually more abundant than *Culex tarsalis.* They are capable of transmitting WN from birds to mammals and thus may be the source of some human infections. Selected *Aedes* and *Ochlerotatus* species probably serve as bridge vectors transmitting WN from the *Culex*/bird cycle to humans and horses.[2,14,15,16] *Aedes vexans* is Saskatchewan's most common mosquito pest for humans, but it rarely feeds on birds and thus rarely becomes infected with WN. *Ochlerotatus nigromaculis* is a grassland species restricted to the southern parts of Saskatchewan, south of the Trans-Canada Highway. It breeds in shallow pasture depressions and weedy ditches. The first adults are encountered in July and a second generation is possible in September if conditions are favourable. It is a severe biter and can take multiple blood meals.

Of the other species shown in Table 1, virus transmission by most woodland *Ochlerotatus* and *Aedes* species rarely occurs due to their reluctance to take more than one blood meal during their lifetime. *Ochleratatus sticticus*, a species associated with *Aedes vexans*, is a floodwater species that is only abundant in localized areas that flood over extensive areas. *Ochleratatus canadensis,*

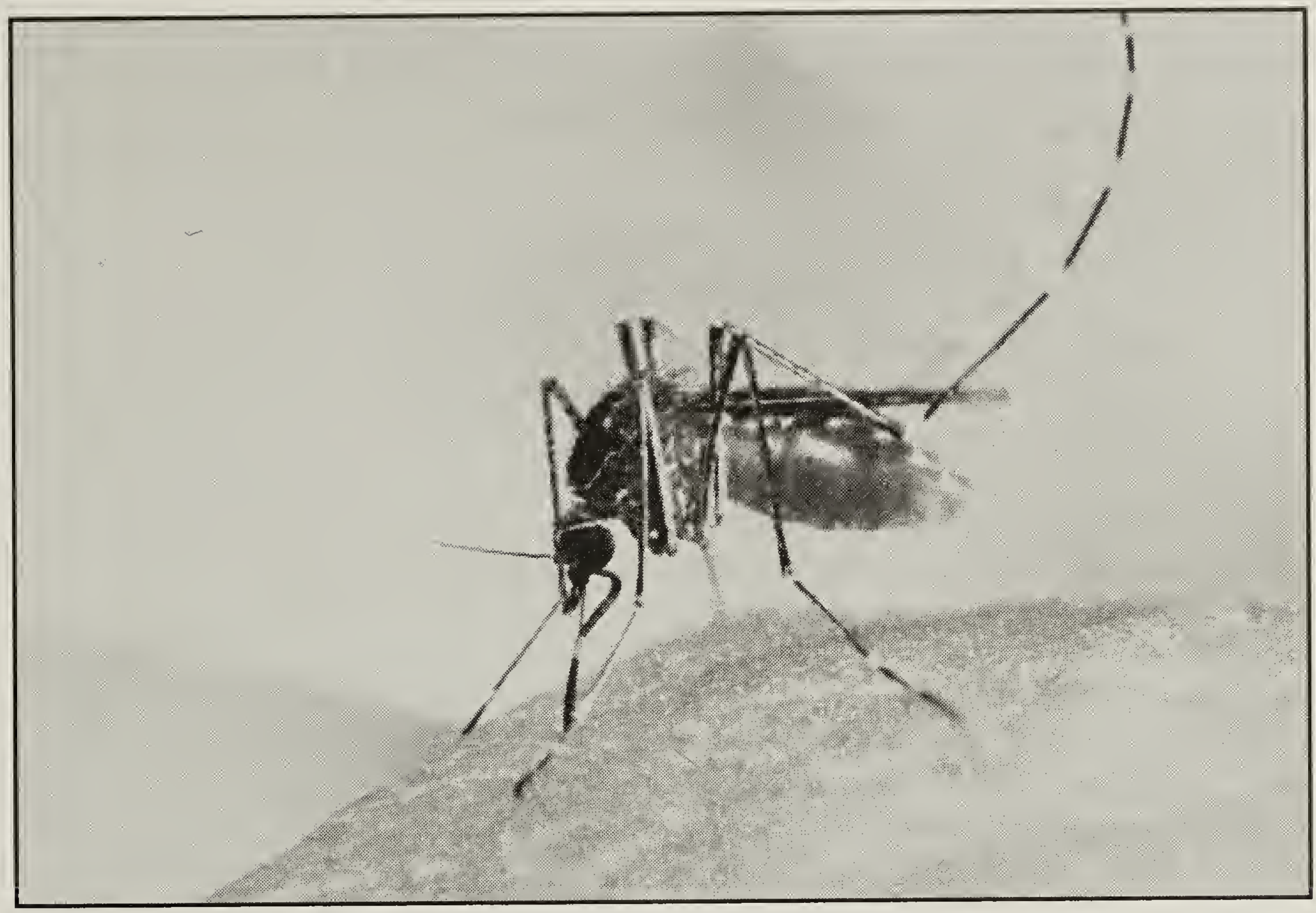

Figure 1. **Culex tarsalis.** ***This "elegant," medium-sized species is relatively easy to identify. The females have rounded abdomens, not pointed as in*** **Ochlerotatus** ***and*** **Aedes** ***species.*** **Culex tarsalis** ***also has a broad median white band on the proboscis and conspicuous apical and basal rings on the segments of the legs*** ***Ralph Underwood***

Ochleratatus fitchii, Ochleratatus provocans and *Aedes cinereus* are mammal-feeding, woodland species that are sometimes common and have a widespread distribution in the province. They are most abundant in the northern parklands and boreal forest transition zone. *Aedes cinereus* is not encountered in prairie regions. *Anopheles earlei* and *Anopheles walkeri* are widespread species in parkland and forested areas that can have several generations per year. *Culiseta impatiens* is a relatively rare northern forest species that prefers shaded pools in coniferous forest areas. *Culiseta morsitans* is found in the aspen parkland area and southern boreal forest areas, often breeding in habitats containing sedges. Unlike the other species of *Culiseta,* this species over-winters in the egg stage and not as adult females. *Coquillettidia perturbans* is a cattail marsh mosquito, but is rarely encountered in Saskatchewan.

Biology of *Culex tarsalis*

The main mosquito vector or transmitter of WN to humans in Saskatchewan appears to be *Culex tarsalis* (Figure 1). This species is also the main vector of two other important disease-causing viruses that are known to occur from time to time in Saskatchewan: Western Equine Encephalitis virus and St. Louis Encephalitis virus.

Culex tarsalis over-winters as adult females that hibernate in skunk and badger burrows, basements, cellars, caves and buildings that provide some protection from the cold.[10, 21] Adults emerge from hibernation from early to late April in southern Saskatchewan when the outside temperatures start to exceed the temperatures where they are hibernating.[10] *Culex tarsalis* may have several generations per year, with eggs laid in floating egg rafts throughout the spring and summer. Development of the first generation in the

Table 2. Week of First Occurrence of 1st, 2nd and 3rd Generation *Culex tarsalis* in Saskatchewan 2003

Grassland Ecoregion (n=10)	**Gen 1**	**Gen 2**	**Gen 3**
Mean	June 16-June 22	July 7-July 13	July 28-August 3
Range	June 9-June 22	June 30-July 27	July 14-Aug. 10
Parkland Ecoregion (n=19)			
Mean	July 7-July 13	July 28-Aug. 3	Aug. 18-Aug. 24
Range	June 23-July 20	July 21-Aug.17	July 21-Aug. 31
Boreal Transition Ecoregion (n=7)			
Mean	July 7-July 13	July 28-Aug. 3	Aug. 4 – Aug. 10
Range	June 23-July 27	July 21-Aug. 17	Aug. 4 – Aug. 10

water is relatively slow and is dependent on water temperature. Adults from this first generation usually appear during the middle of June in southern prairie areas and near the end of June in more northerly parkland areas. Larger numbers of *Culex tarsalis* start to appear with the emergence of the second generation adults in July and, depending on weather, numbers can build up to substantial populations by late summer. Three generations per season are usual for this species in southern areas while two per season are usual in the parklands. In 2003, high mean daily temperatures and a long frost-free period resulted in four generations of *Culex tarsalis* in southern prairie areas and three in the parkland and boreal transition areas (Table 2). *Culex tarsalis* adults have been caught in sampling traps in September, but these are usually inseminated females getting ready for hibernation. Most females of this last generation do not take a blood meal.

In the spring, small numbers of *Culex tarsalis* larvae usually can be found in shallow, permanent and semi-permanent ponds, irrigated areas and weedy roadside ditches, often in association with *Culiseta inornata*.[7, 19,20] However, as populations build during the summer, larvae may be found in temporary water bodies, including artificial containers, water-filled hoof prints near livestock watering sites, bird baths, used tires, and foul water in corrals and around feedlots.[7, 20]

Culex tarsalis has a wide distribution throughout the prairie areas of Saskatchewan with its northern limit being the aspen parkland and boreal transition ecoregions. The species is more numerous south of a line running in a northwesterly direction from Yorkton through Saskatoon, North Battleford and Lloydminster. However, if climatic conditions are favourable during the summer, its numbers may be large even in parkland and forest fringe areas by early August. Historically, southeastern Saskatchewan has had consistently higher numbers of *Culex tarsalis* than have other regions, due mainly to higher heat units for development, relatively high precipitation levels, and higher wetland densities in the southeast. This traditional distribution appears to be changing, however, perhaps due to the impacts of climate change (i.e. warmer winters, warmer minimum daily temperature, greater accumulations of heat units required for development and longer frost-free periods). In 2003, *Culex tarsalis* was found at 46 locations throughout the province and as far north as Spiritwood and Meadow Lake. Although overall populations were low, *Culex tarsalis* was more numerous in southern grassland ecoregions than in the parkland or boreal transition ecoregions. The range of average counts in New Jersey mosquito traps placed in 34 different communities in July and August 2003 were 16.8 to 56.6 for grassland habitat and 6.4 to 29.9 for parkland habitat.

In Saskatoon and Regina, *Culex tarsalis* is present each summer, but in varying numbers. For example, in Regina, *Culex tarsalis* made up approximately 0.1 percent of the total mosquito population captured during 2002, and from 1994-2002 *Culex tarsalis* levels have averaged about 0.01 percent of the total mosquitoes trapped. In 1993, however, *Culex tarsalis* comprised 5.6 percent of the total seasonal catch.[9]

This species can become a significant part of the total mosquito population later in the summer. Table 3 shows the midsummer *Culex tarsalis* populations from five selected localities in 2003. Populations varied from 1.3 – 11.8 percent of the total mosquitoes caught during the mid-June to mid-September period. Although these numbers represent the entire period, there are specific weeks in August when *Culex tarsalis* numbers reached as high as 67 percent of the total in Leader, 39 percent in Maple Creek, 48 percent in Rowan's Ravine, 9 percent in Melfort and 15 percent in Lloydminster. Furthermore, New Jersey light traps do not catch as high a proportion of *Culex* species as do CDC Traps baited with CO_2. When using catch numbers from these types of traps the numbers and proportions of *Culex tarsalis* rise sharply (Table 4). The risk of a person being bitten by a WN infected *Culex tarsalis,* when this species is abundant and virus is present in local wild birds, is quite high, with the period of greatest risk being mid-July to mid-August.

Avoiding West Nile virus

Most mosquitoes, including *Culex tarsalis*, are very active at dusk and dawn. According to Hearle, *Culex tarsalis* is active

Table 3. Mid-summer mosquito abundance in southern Saskatchewan in 2003, with New Jersey light traps (total number of *Culex tarsalis* and all other species females caught during the season and the percent of *Culex tarsalis* of the total)

Location	**Leader**	**Maple Creek**	**Rowan's Ravine**	**Melfort**	**Lloydminster**	**All traps**
Period operated	June 16- Sept. 21	June 9 – Sept. 28	June 16 – Sept. 14	June 16 – Aug. 14	June 16 – Sept. 21	
Culex tarsalis	94	65	203	16	110	488
Total mosquitoes	1085	667	1716	1223	1968	6659
% of Total	8.7	9.7	11.8	1.3	5.6	7.3

Table 4. Mid-summer mosquito abundance in southern Saskatchewan, 2003 with CDC traps and CO^2 (total number of *Culex tarsalis* and all other species females caught during the season and the percent of *Culex tarsalis* of the total)

Location	**Assiniboia**	**Gull Lake**	**Dundurn**	**Melfort**	**Lloydminster**	**All traps**
Period operated	Aug. 4 – Sept. 14	July 28 – Sept. 7	July 28 – Sept. 7	July 21 – Sept. 14	Aug. 11 – Sept. 14	
Culex tarsalis	81	68	146	42	127	464
Total mosquitoes	227	154	842	2370	250	3843
% of Total	35.7	44.2	17.3	1.8	5.6	12.1

at dusk, when it makes persistent efforts to enter houses in search of blood meals.[11] He reports that females are painful and persistent biters, and are easily disturbed. McLintock reports this species to bite readily even during the day and often to be troublesome to children.[13] If you need to be outside when mosquitoes are active, wear light colored clothing with long-sleeved shirts or jackets, long pants and socks. Use mosquito netting on strollers to protect infants and toddlers, and use bug spray. All three *Culex* species in Saskatchewan can breed in containers and other areas with standing water right in your own back yard. Clean up and empty containers of standing water: old tires, flower pots, barrels, or tin cans. Empty and clean bird baths once a week and cover rain barrels with mesh or screen. Remove water that collects on pool covers, and check eaves and drains. Clear leaves and twigs from eaves-troughs, storm and roof gutters throughout the summer. Make sure drainage ditches are not clogged and fill in low depressions in lawn areas. Cut the lawn frequently and clear out dense shrubbery where mosquitoes like to rest during the day. Finally, check window and door screens for holes and make sure they fit snugly into frames. For further information on WN virus and control of mosquitoes around your home, consult the Saskatchewan Health website at:www.health.gov.sk.ca or the Health Canada website at: http://www.hc-sc.gc.ca

Other mosquito-borne viruses in Saskatchewan

Saskatchewan mosquitoes are host to several viruses in addition to West Nile virus (Table 5) and these viruses were present in the province long before the arrival of WN. They include viruses important to human health, such as St. Louis and Western Equine encephalitis viruses, the less serious viruses of the group called the California encephalitis virus complex and some viruses that are not known to cause any human disease at all: Turlock, Hart Park Flanders and Cache Valley viruses.[3, 17] Cache Valley virus is primarily a virus of mammals. The several strains of California encephalitis virus are found in squirrels and snowshoe hares, and primarily occur in the boreal forest and tundra.[12, 18, 23]

Acknowledgements

The author would like to thank Scott Hartley (Saskatchewan Agriculture, Food &

Table 5. Mosquito-borne viruses from Saskatchewan [1,2,3, 6,12, 14,15,16, 18, 22, 23] (Cx.=Culex; Cs.=Culiseta; Ae.=Aedes; Och.=Ochlerotatus; Ano.=Anopheles; Coq.=Coquillitidia)

Species	Habitat	West. Equine	St. Louis	Hart Park Flanders	Cache Valley	Turlock	California **
Cx. tarsalis	**prairie**	x	x	x		x	
Cs. inornata	prairie	x			X	x	x
Ano. earlei	prairie	x					
Och.campestris	prairie	x					
Och. spencerii	prairie	x					
Och. flavescens	prairie	x					
Och. dorsalis	prairie	x					
Ae. vexans	prairie	x					
Och.implicatus	woodland						x *
Och. punctor	woodland						x
Och. excrucians	woodland						x
Och.cataphylla	woodland						x
Och. fitchii	woodland						x

* mother-to-offspring transmission of virus ** Snowshoe Hare and/or Jamestown Canyon strains

Rural Revitalization), Taz Stuart and Wade Morrow (City of Regina), and Jeff Balone (City of Saskatoon) for input into this paper as part of the Saskatchewan West Nile Virus Working Group entomology committee. I would also like to thank Dr. Peter Belton (Simon Fraser University) who provided information on vectorial competence and host preference, and Dale Parker (AquaTax Consulting) and Taz Stuart (TDTS Consulting) who identified the mosquitoes caught in the 2003 season in Saskatchewan.

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FIRST SWAINSON'S HAWK BREEDING IN RESIDENTIAL SASKATOON

Buteos are relatively intolerant of human presence, and may desert their nest if a person climbs up to it, or even visits the foot of the tree during incubation.[1] This is especially true of Swainson's and Ferruginous hawks. Some pairs, however, are less fearful of humans. On the premises of the Jubilee Lodge in Eston, on July 14, 1995, an adult Swainson's Hawk attacked two ladies, both of whom suffered claw cuts, (one of them requiring sutures at the hospital), when they walked below the nest; conservation officers removed the nestling hawks from the nest and added one each to nests in adjacent rural areas.[3]

The first published records of urban-nesting Swainson's Hawks were from Regina, 1988-1991; Paul James reported one nest in a city park, two in coniferous trees in residential areas, and two in industrial areas in this four year period. One of the latter was readily visible, without protective cover, on a signal gantry where a railroad crossed a street in the industrial area.[2]

In Saskatoon, two or more pairs have nested regularly within the city limits, but near the periphery, such as in the University of Saskatchewan fields and gardens, and near highway intersections both north and south of the city proper. Since 2000, a pair has nested on a busy thoroughfare, Millar Avenue, in the north industrial area.

In 2003, the first known nest within a Saskatoon residential area was discovered. The nest, invisible from most angles, was about 16 m above ground near the top of a spruce, in the front yard at 1020 Avenue B

Swainson's Hawk nest with a view of the Kelsey Institute in Saskatoon, 23 July 2003.
Brenton Terry

North (between Avenues 31 and 32). The owner of the home, José Perez, kindly gave permission for the first author and Brenton Terry to band the three young in the nest on July 23. The two adults, one light-phase and one medium-light, maintained a respectful distance, without making the alarm calls expected in a rural setting. The young grew and fledged under the watchful eye of area residents, who appreciated their new neighbors.

The location is a block from the east edge of densely packed, single-dwelling homes that extend over 5 km west to the city limits and 1.5 km north. We presume that the adult hawks did most of their hunting two city blocks to the east where there is an open industrial area, with rail yards, a flour mill, and some grassy fields with a moderate population of ground squirrels, but University of Saskatchewan and airport haylands could each be reached with a 2.5 km flight.

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BLIND MULE DEER

Within a five day span in December 2002, the Saskatchewan Environment conservation officers at Leader, Saskatchewan, were called to investigate two Mule Deer bucks that appeared to be blind. Both bucks were 1.5 years old (yearlings) and appeared to be healthy, except for their eyes, which were clouded over and white.

The bucks were killed humanely and submitted to the Canadian Cooperative Wildlife Health Centre, Western College of Veterinary Medicine (University of Saskatchewan) for examination. In the report for one of the bucks, Dr. Trent Bollinger stated: "The results of the examination showed the deer had inflammation, ulceration and edema of the corneas of both eyes which accounted for its blindness. These types of lesions are relatively frequent in cattle during summer months, but unusual in the winter. In North Dakota, there was a report of deer developing blindness and corneal ulceration after a severe winter storm caused the corneas to freeze. This is possibly what happened in this case."

In December of 2003, along the South Saskatchewan River northwest of Leader, I spotted another young Mule Deer buck that appeared to be blind. Since the wind was blowing my scent away from the deer, I was able to approach the buck undetected. Because it could not see, the deer was using all of its other senses to determine if danger

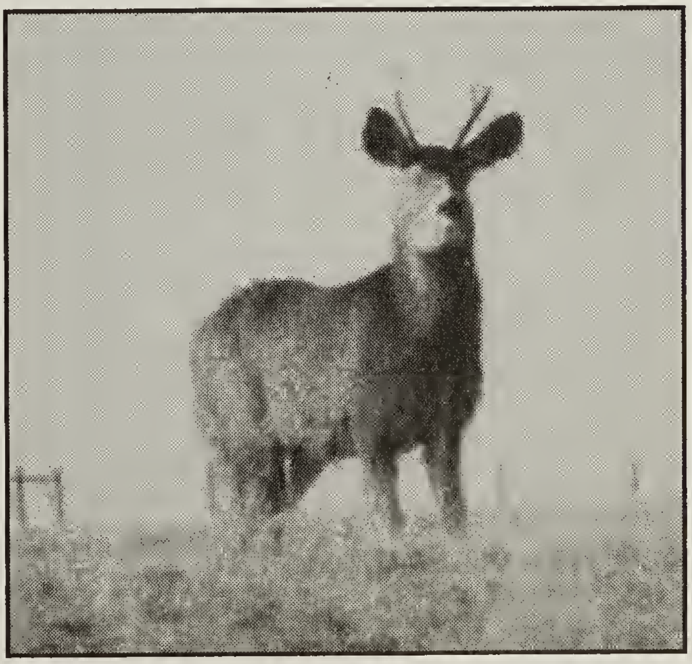

Figure 1. Blind Mule Deer buck sniffing and trying to detect danger. December 12, Leader, SK Kerry Wrishko.

was present. It spun around, sniffing the air with its ears forward, listening intently for any sound (Figure 1). The hair around its neck was standing up, not unlike a cat or dog when it senses danger (Figure 2).

The deer walked gingerly, going around some shrubs without running into them or tripping, to about 4 meters away. The deer's eyes were clearly white (Figure 2), similar to those on the deer seen a year earlier.

The deer finally made its way to a point downwind where, smelling the human scent, he attempted to escape. It ran for only about 10 meters, however, then started to walk away again, in a manner slow enough to let him "feel" his way to safety.

Although animals such as this provide an interesting case study for scientists, and it is important for us to understand diseases that affect wildlife, this deer was not killed for examination. I felt that the two deer from 2002 had not revealed the cause of injury resulting in blindness and was hopeful that the condition might reverse itself.

A blind deer certainly does not have its full resources to avoid predators. However, if the deer had been killed, it would have had no chance of survival. This is a very difficult decision that is considered whenever we are faced with what we perceive to be wildlife in peril: should we intervene or let nature take its course?

- *Kerry Wrishko*, Box 70, Leader, SK S0N 1H0

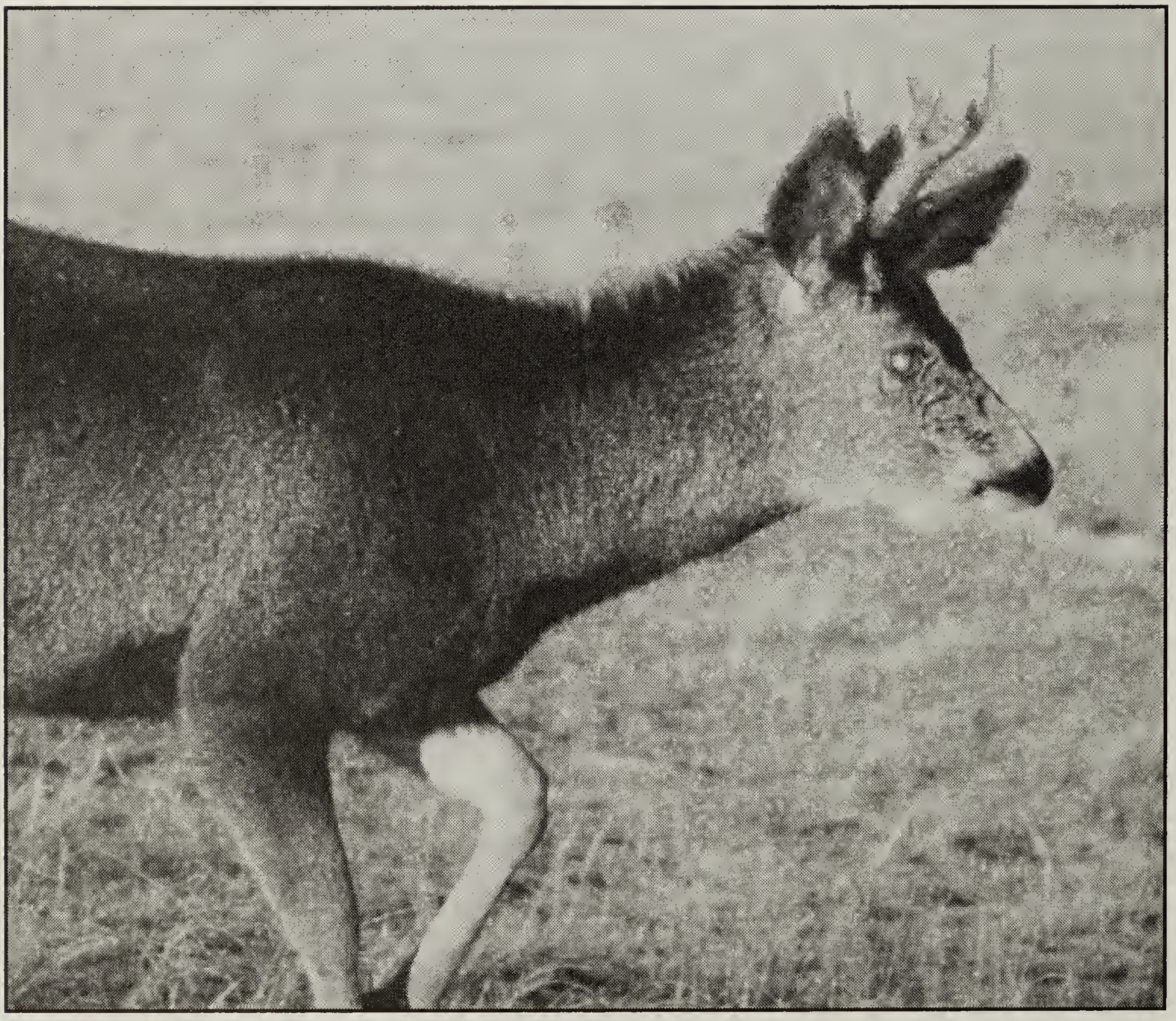

Figure 2. Close-up of blind Mule Deer, showing the white eyes ***Kerry Wrishko***

MORE ON WOLVERINES

Daisy Meyers writes from Leader, SK:

"In the article 'Wolverine sighting south of Saskatoon' in the March 2004 issue of *Blue Jay*, the editor's note at the bottom states that there have been two previous reports south of their expected range. I would like to add a third wolverine. Enclosed is a photograph of an article in the April 18, 1979 issue of the *Leader News*, showing local trapper Larry Ausmus with a wolverine he had captured." [According to the article, Larry trailed the wolverine for almost 10 miles before he shot it about 6 miles west of Leader "early Wednesday morning." (*Leader News*, April 18, 1979). Eds.]

And from Beth Madden, Refuge Biologist at the Medicine Lake National Wildlife Refuge Complex in Montana:

"In 1998, a wolverine was killed here on a sheep ranch just outside the town of Medicine Lake, Montana. The Montana Department of Fish, Wildlife and Parks made a taxidermy mount of the animal and it is on display here at the Medicine Lake National Wildlife Refuge. The local residents were fascinated to learn about this transient animal that had wandered so far from its natural range, and they have affectionately dubbed it "Wally" the wolverine (Figure 1).

"To help orient you, Medicine Lake is 22 miles south of Plentywood, Montana, which is about 15 miles south of the Regway, SK border crossing. We are a prairie and grain agricultural area, with the only trees found in planted shelterbelts."

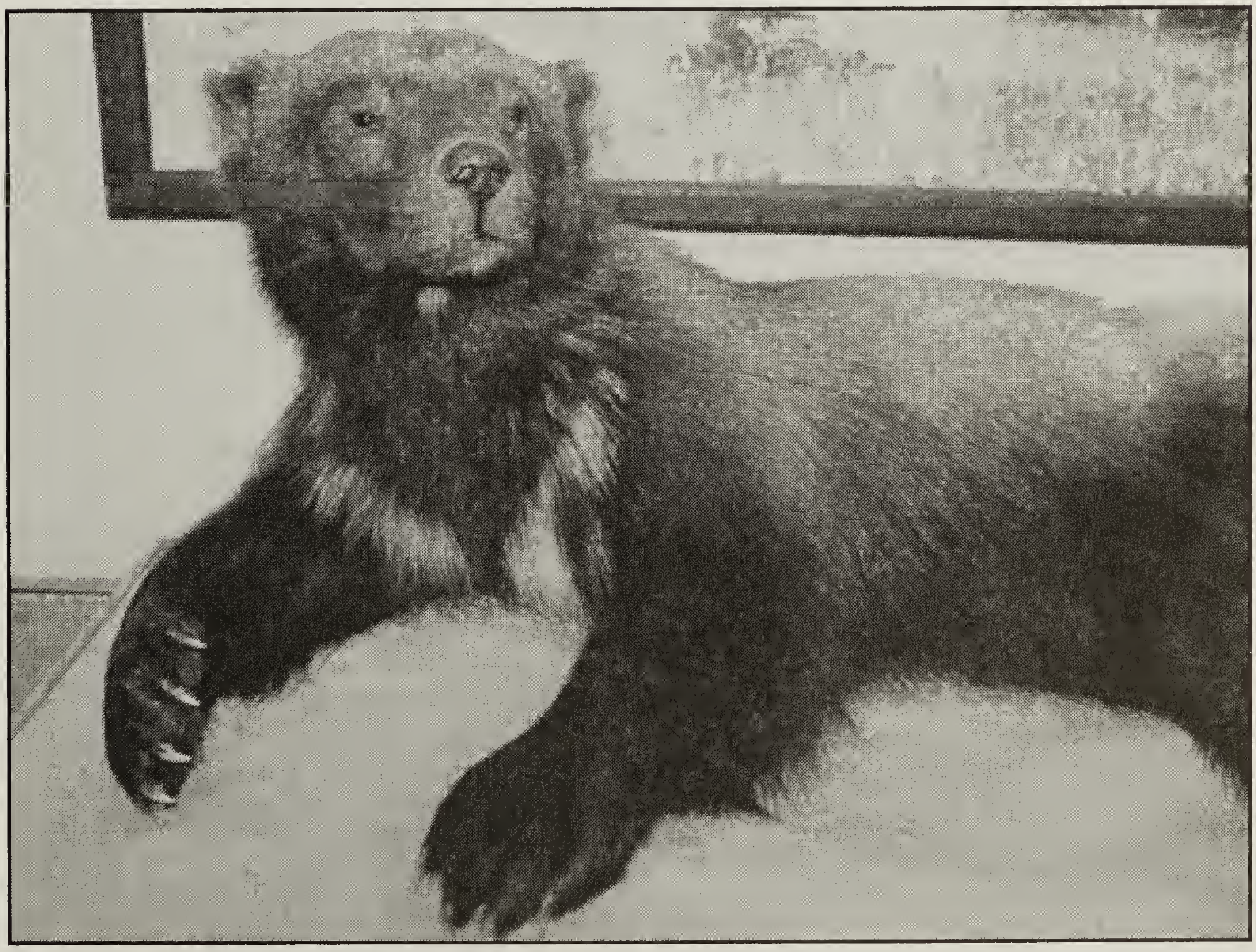

Figure 1. Wolverine ("Wally") from Medicine Lake, Montana ***Beth Madden***

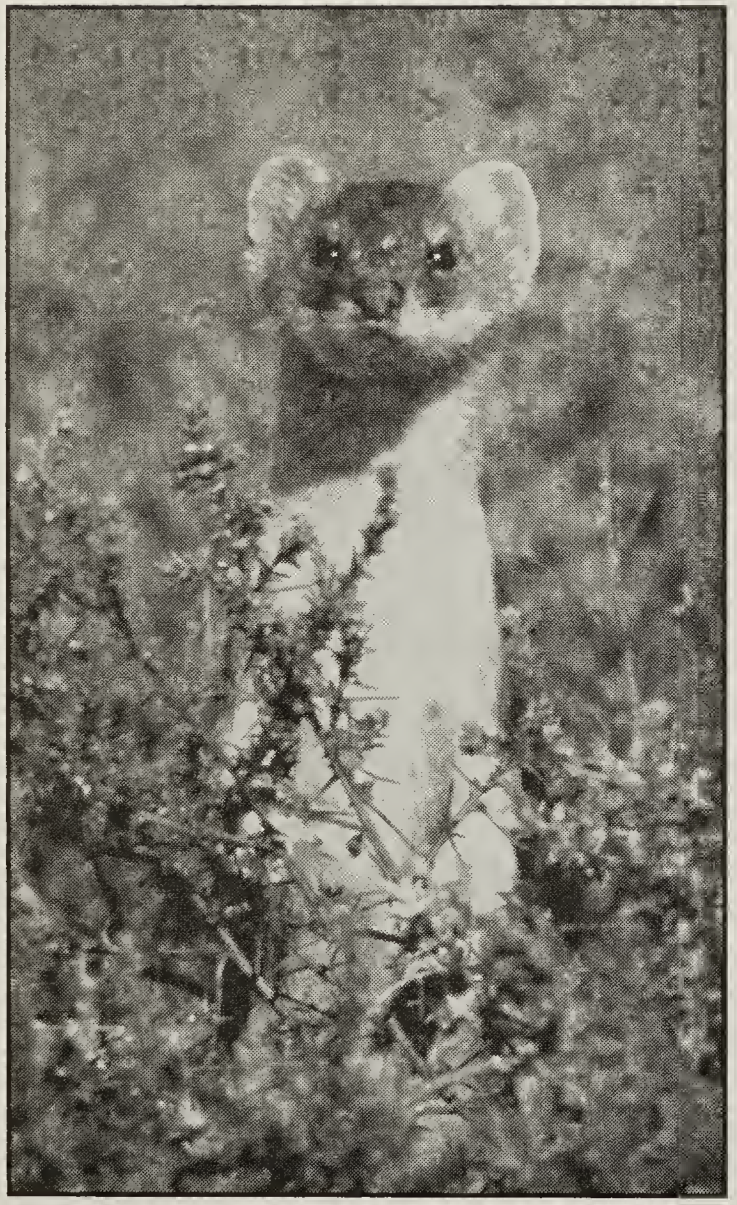

Figure 1. Long-tailed Weasel with typical facial markings, near Saskatoon
Claire Jardine

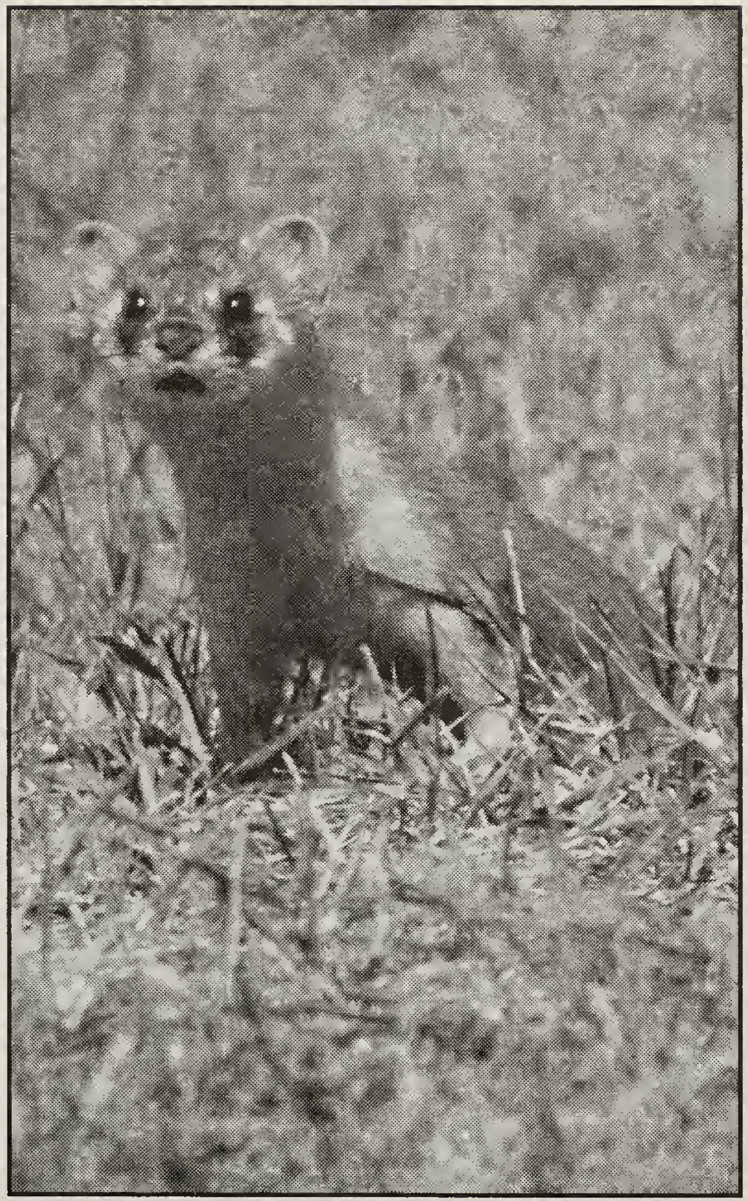

Figure 2. Long-tailed Weasel with unusual facial mask, near Saskatoon
Claire Jardine

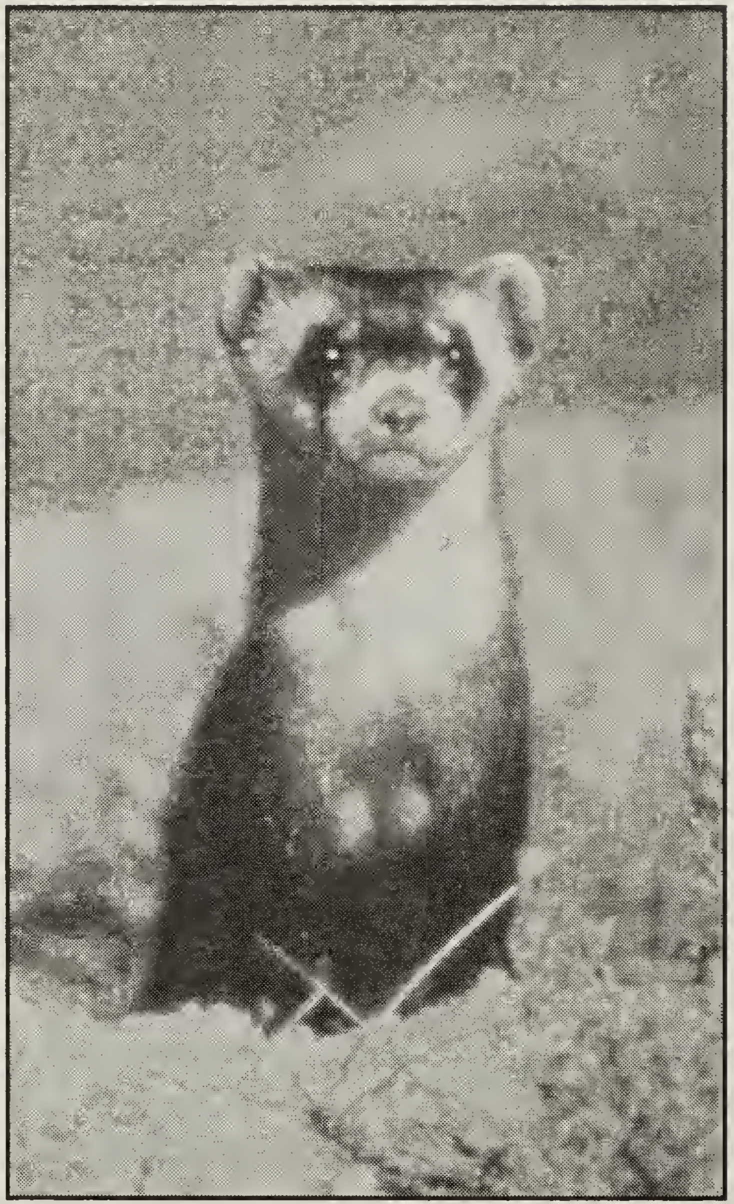

Figure 3. Black-footed Ferret photographed by LuRay Parker, Wyoming Game & Fish Department

UNUSUAL "MASKED" LONG-TAILED WEASEL

While live-trapping Richardson's Ground Squirrels near Saskatoon, as part of a study of infectious diseases, I observed a number of Long-tailed Weasels that were using the study sites as hunting grounds (Fig. 1).

One of these weasels had unusual facial markings, consisting of a dark brown mask extending down from the eyes (Fig. 2 and front cover). At first glance, these markings made the animal resemble a Black-footed Ferret; however, Black-footed Ferrets were extirpated from Canada by 1974 and, in any event, they always live in close association with Black-tailed Prairie Dog colonies, not with ground squirrels. Convinced that this must simply be an unusual colour variation of the Long-tailed Weasel, I consulted Peterson's field guide to mammals and Banfield's *The Mammals of Canada*.[1,2] According to these sources, the markings of this weasel were not typical of what one would expect around Saskatoon. However, Long-tailed Weasels in the southwestern United States have facial markings similar to those I observed.

I sent several pictures I took of the weasel to David Baron, the director of the Royal Saskatchewan Museum (RSM), and Harold Bryant, the Curator of Earth Sciences at the RSM and former Curator of Mammals at the Provincial Museum of Alberta. Both agreed that the facial markings were unusual, certainly for an animal from the Saskatoon area. They sent the pictures to Gilbert Proulx, at Alpha Wildlife Research & Management Ltd., who, as it turned out, had seen a Long-tailed Weasel with similar facial markings a few years ago in Gwynne, Alberta (near Camrose). He only got a quick glimpse of the animal and wondered, like I did, if it could be a Black-footed Ferret. Unfortunately, despite hours of trying, he was unable to observe the animal again and had been "haunted by this observation for years".

It appears that weasels with facial masks are not very common but I hope these pictures will bring peace of mind to other people who are lucky enough see one and wonder "could it be a Black-footed Ferret?"

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* * *

"Gyrfalcon. Instead of a noble falcon or a circling falcon, the gyrfalcon is a 'greedy falcon'. The word is not related to either *gyro*, 'to circle' as it does before swooping down upon its prey, or to *hieros*, Greek for 'noble' or 'devine'. Gyrfalcon can be traced to Germanic origins.... The Low Latin *gyrofalco* and *girefalco* (which latter was corrupted to *gyrofalco* and gave rise to one erroneous etymology) came from *girvalke, gir* from the Old High German *giri,* 'greedy' and *valke,* 'falcon'." Edward S. Gruson, Words for Birds, p.73

NATURE LIBRARY

THE BIRDS OF MANITOBA

MANITOBA AVIAN RESEARCH COMMITTEE, Eds. 2003. Manitoba Naturalists Society, Winnipeg. 504 pages, 80 colour plates,171 black and white drawings and 62 black and white photographs. 23 x 31 cm (9 1/4 in by 12 1/4 inches). $63.95 Can.

Impressive, incomparable–any number of superlatives may be used to describe *The Birds of Manitoba*. A great birding province has just published a great bird book. Thanks to the efforts of the Manitoba Avian Research Committee, the Manitoba Naturalists Society and innumerable volunteers, the book is an excellent production. The superb editing of Peter Taylor, combined with the incredible artistic skills of Rudolf Koes, has produced a volume that is attractive, informative and very readable. This is a large format, hard-cover book amply illustrated with watercolors of birds by Koes and color photographs, as well as black and white photographs of habitats and people, and line drawings, also by Koes, of many of the species mentioned.

The six introductory chapters, illustrated with black and white photographs, provide information on birding hot spots, the history of ornithology in Manitoba, physical geography with respect to bird distribution, ecosystems and habitats for birds, aboriginal cultural beliefs and practices involving birds, and bird conservation.

The second of these introductory chapters, "The History of Ornithology in Canada's Keystone Province," looks back over more than 200 years to the observers, collectors and authors who provide a backdrop for today's professional and amateur birders, from Forster's list in 1772 to Ernest Thompson Seton, the Criddle brothers, Donald Gunn, George Atkinson, Hamilton Lang and Ernest Korman. It also provides background on The Manitoba Naturalists Society and its periodical publications, among them "Chickadee Notes" in the *Winnipeg Free Press*, a weekly column started by A.G.Lawrence in 1921. Winnipeg's other daily paper, the *Winnipeg Tribune*, had a similar column "Wild Wings" started by Bertram W. Cartwright in 1928. The Naturalist's Society published a number of lists and journals from the 1880's to the late 1980's, among them *Zoolog* a joint publication with the Zoological Society of Manitoba which ran from 1968 to 1982 with a name change to *Manitoba Nature* in 1972. This chapter also has sections on academic ornithology, museum ornithology, the role of Ducks Unlimited, amateur ornithologists, bird artists and the provincial bird emblem, the Great Gray Owl, with Bob Nero's and Herb Copland's involvement with the species.

The fifth introductory chapter, "Aboriginal People and Birds, a Brief Cultural History of Manitoba's First People" delves into aboriginal uses of birds as well as classification systems and beliefs about birds, including the importance of winged creatures, in particular the eagle, bird legends and bird names.

The main focus of the species accounts, as explained in the seventh chapter, is to answer questions about each species such as "Where?", "When?", "How many?" and "How likely?" or "How significant?" Sources of information for the accounts include published sources and museum collections as well as Breeding Bird Surveys, Christmas Bird Counts, the Prairie Nest Record Scheme, the Manitoba Avian Research Committee (MARC) computerized database with over 70,000 observations and MARC's record file (the primary source of information on rare species).

A total of 43 authors contributed to the species accounts. The individual accounts are in essay form and very readable. They detail migration times, abundance, breeding records, songs and calls, behaviour and field marks. There is a distribution map for each species showing breeding, wintering and migration areas with dots pin-pointing locations of accidental occurrences and extralimital breeding records. The species accounts cover 328 pages; 30 hypothetical, failed introductions and escapee species are listed separately.

Line drawings of 173 species accompany the species accounts. There are also 121 colour portraits of birds and 70 colour photos (rare and uncommon species). Mention must be made of Dennis Fast, who contributed 25 of the colour photos; 35 other photographers provided the rest of the photos. The colour plates are grouped into 5 sections of 16 plates each. Seventeen species are illustrated in both black and white and colour, 47 species (primarily accidentals) have no illustration. As a challenge to some readers, some of the black and white drawings are at the top or the bottom or in part of the adjoining species accounts. These drawings are unlabeled, but the species are identified in an index of black and white drawings near the end of the book.

Occasional bits of humour are included in some accounts. For example: the giant subspecies of Canada Goose, almost extinct at one time "Has evolved from a hunter's myth to a golfer's despair" (p.99), and the Yellow-headed Blackbird: "To gain some idea of the strange chorus that emanates from a breeding colony, imagine a flock of birds taking their first bagpipe lesson" (p.377).

There are five appendices. Appendix A, "Details of Rare Bird Records," is a table of dates, locations, numbers, references and MARC's assessment of status (accepted, unconfirmed or hypothetical) for the 49 rare species (those with 15 records or fewer) and one generic group "Unidentified Ibis." About half of the rare species are illustrated in color photographs grouped on 16 pages of plates toward the end of the book.

Appendix B. "Breeding Bird Surveys," includes a text summary, map and tables of information on the 31 Breeding Bird Survey routes surveyed for 10 years or more between 1967 and 1999 (plus the Beulah and Churchill routes for their inherent interest). Appendix C, "Christmas Bird Counts," similarly provides a text summary, map and tables of data on certain counts–the 20 that have been run at least seven times between 1960 and 1999.

Appendix D lists the scientific names for all organisms other than birds and invertebrates that are mentioned in the text, and Appendix E is a gazetteer providing the latitude and longitude of the localities mentioned in the book. A detailed bibliography, an index to birds mentioned in the text and a checklist of Manitoba birds complete the book.

The four colour end plates show the Bird Conservation Regions of North America, the Bird Conservation Regions of Manitoba, a topographical map of Manitoba and the major parks and wildlife management areas in the province. The front and back covers and spine show six species of birds in colour, duplicates of Rudolf Koes' portraits that appear in the text and they add a visual appeal to the book.

Shortcomings are few in number, and minor, but none-the-less need comment. The reviewer has a penchant for indices, summaries and totals. While the bird species and other organisms are indexed, a general index would simplify searching for information in the introductory section. The Breeding Bird Survey and Christmas Bird Count summaries are very readable, but totals and listing of all routes would be meaningful–if not in this volume then for future researchers. Banding activities are mentioned only in species accounts. Again, a summary with totals would add to the content of the book.

A map showing the location of all the localities mentioned in the species accounts would be a help to the reader. Labeling of the colour plates is a bit confusing until you realize that the bird at the top of each plate is listed last in the caption.

These are minor faults and they do not reflect on the overall quality of the book. Readable, enjoyable, a source of pride for the participants, *The Birds of Manitoba* is informative not only for Manitoba birders but also for all birders in Western Canada and the northern United States.

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EIGHTEENTH-CENTURY NATURALISTS OF HUDSON BAY

STUART HOUSTON, TIM BALL and MARY HOUSTON. 2003. McGill-Queen's University Press, Montreal and Kingston. ISBN 0-7735-2285-9 Hard cover. $49.95 Can.

This book reflects the long standing natural history (especially ornithological) interests of Stuart and Mary Houston, as well as the climatological scholarship of Tim Ball. In some ways this is a curious compendium, a tome that, appropriately enough, is peopled by "curious men" - an 18th century term applied to those individuals who were curious about the natural world. These "curious men" were the forerunners of the scientists whose disciplines became formalized in the 19th century.

The book begins with a series of eight colour plates of avian water colours by George Edwards, whose work complemented and supported the taxonomic efforts of Carolus von Linnaeus. This very attractive opening section is followed by an introductory essay which sets out the rationale for this volume: "… to make amends for past neglect …" of "… the outstanding achievements of a small group of early weather observers and natural-history collectors around Hudson Bay …" (p. 3). This introductory chapter then proceeds to a succinct overview of the Hudson's Bay Company (HBC), the latter's predominantly Orcadian workforce, the posts around the Bay, the aboriginal peoples of the region, and the nature of the times. With regard to the latter, it is noted that the HBC's trade began during the Little Ice Age, "just prior to the coldest decade, the 1680s" (p. 11). It is becoming more and more apparent to historians, geographers and anthropologists that climatic conditions at this time must be carefully considered for the impact they may have had on aboriginal lifeways and European mercantile adventures. The introduction also provides a discussion of the blossoming of natural history studies in western Europe (especially Britain) in the last half of the 18th century: "… in all of North America, Hudson Bay was second only to South Carolina as a source of records and data for the revolutionary scientific endeavour led by a Swede, Carolus von Linnaeus, …" (p. 3).

Chapter 1, "The European Connection", sets out in considerable detail, the scholarly context which received the natural history observations and materials from Hudson Bay. In particular, the scholarly activities of Sir Hans Sloane, George Edwards, Carolus von Linnaeus, Johann Reinhold Forster, Thomas Pennant, John Latham, Rev. Dr John Walker, and Samuel Wegg are summarized. The eight chapters that follow each outline the natural history activities and contributions of an individual HBC employee on Hudson Bay:

Alexander Light, James Isham, Humphrey Marten, Andrew Graham, Thomas Hutchins, Moses Norton, Samuel Hearne and Peter Fidler. Each of these men was involved in collecting various plant specimens, as well as study skins of birds and mammals. These collections were made as a result of formal requests to the board of the HBC by the Royal Society. Of these collectors on Hudson Bay, only Dr. Hutchins was formally trained, although both Isham and Graham wrote substantive treatises on the natural history of the York Factory and Ft. Albany regions. The observations of Samuel Hearne are singled out for particular praise.

Chapter 10, "Natural History", details the new faunal and floral species that were officially recognized as a result of the collecting efforts of the men on Hudson Bay. The meaning of the adjective "Hudsonian" is discussed, as well as the motivations of the collectors and the difficulties of preserving study specimens. Very useful is a consideration of a number of previous errors and omissions relating to natural history observations on Hudson Bay.

Chapter 11, presumably mainly from the pen of Dr. Ball, is entitled "Climatology". This fascinating essay recounts the nature of the meteorological observations kept at the posts on Hudson Bay, particularly temperature and daily weather observations. Astonishingly: "... no other region of the world has such an extensive and detailed record of climate and environment over such a prolonged period" (p. 117). In particular, Ball and others have developed techniques by which to extract and systematize these observations in order to determine climatic changes since the late 1600s in this huge section of interior North America. Significantly, the long term observations of resident fur traders, and especially of aboriginal elders in the 18th and 19th centuries are identified as of considerable importance. Notably, the aboriginal peoples were well aware of the fact that the tree line had formerly been farther north (p. 134).

The final Chapter, 12, "In Striking Contrast: Charles Town," is an overview of the significance of this city (present day Charleston, South Carolina), culturally and industrially, in the 18th century. The background to the natural history collections made by educated residents of this city is discussed.

A series of seven appendices completes this treatise. Oddly enough, most of these have titles that differ from those listed in the table of contents. The first appendix is a table listing the ships that sailed annually to Hudson Bay from 1716 through to 1892, along with their dates of arrival and departure, as well as notable events or misadventures - such as the inability to even get into Hudson Bay in the summer of 1816 (the year there was no summer). Appendix 2 is a short account by Deidre Simmons of the history of the storage and archiving of the HBC papers, through several buildings in London, followed by their transfer to Winnipeg in 1974 and their eventual incorporation into the Provincial Archives of Manitoba. Next there is a thoughtful piece of detective work by Stuart and Mary Houston regarding the authorship of ten pieces of writing by Andrew Graham and Thomas Hutchins. Some of the documents are by one or the other, but there are also cases of collaboration–and even what we would now see as plagiarism–although this activity was differently regarded in the 18th century.

Stuart Houston presents a very useful essay on the ten-year population cycles of the snowshoe hare, lynx, and several other mammals and birds. He notes the various biologists who have employed the HBC data to elucidate this 10 year cycle. Clearly, scientific knowledge of this cycle would have been reached much more slowly without the fur trade records of the HBC. Particularly fascinating is the fifth appendix, "How the HBC Swan Quill and Swan Skin Trade

Almost Extirpated the Trumpeter Swan". The trade in quills (for pens) and skins (for items of clothing, and for ladies powder puffs) accelerated in the early 1800s, reaching a peak in 1834 when 7,918 skins were traded. Nor surprisingly, by 1935 there were only 69 trumpeter swans known south of Alaska. This overview is useful in placing local HBC activities into a larger context. For instance this writer has been involved in reviewing the Ft. Carlton post journals, and this essay makes explicable the several references to trading swan skins and swan quills - with, incidentally, prominent mention of hunting swans at Duck Lake, 18 km east of Ft. Carlton.

The final appendix, "Cree Names for Natural History Species", was prepared by Stuart and Mary Houston, with the assistance of Arok Wolvengrey and Jean Okimasis, specialists in Cree linguistics with the Saskatchewan Indian Federated College, their contribution is invaluable since it provides the contemporary standard orthography for most of the Cree vocabulary items. This appendix is substantial, running to 48 pages. It consists of the Cree terms in standard orthography - i.e. *okîskimanasiw* 'kingfisher' - followed by the various renderings of that term as recorded by fur traders and anthropologists. This large number of Cree terms for birds, mammals, amphibians, fishes and plants reflects the fact that the largest aboriginal group with whom the HBC traded were Crees and that Crees were in a position of considerable power, a relationship that was unusual from a global perspective. They provided the furs but, very importantly, they also had the skills to live well in the boreal forest as well as the geographical knowledge that allowed long distance travels on the waterways. In this situation, the traders had to acquire a working knowledge of the Cree language. As a result, they learned the names of many plant and animal species. Very importantly, this also enabled them to converse with regional residents about animal behaviour, weather, and climatic fluctuations.

With regard to the appendices, it is not clear just why some of these could not have been chapters in the main body of the text. As well, the book ends with the chapter on Charles Town. While interesting, and necessary to place the Hudson Bay natural history information in perspective, this does not serve well as a summary chapter. No matter, this book is a wonderful piece of scholarship. It reflects the long experience and research of the senior "curious people" who have prepared it. This treatise will become a permanent reference source for scholars involved in biological, ecological, historical and anthropological research in interior Canada.

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WHOSE BIRD? COMMON BIRD NAMES AND THE PEOPLE THEY COMMEMORATE

BO BEOLENS and MICHAEL WATKINS. 2003. Foreword by Ben Schott. Yale University Press, New Haven and London. 400 pp., 154 b/w photographs. Soft cover. ISBN 0-300-10359-X.

This is a book for anyone who finds birds interesting. It will almost certainly provide intriguing, even new, information for the most dedicated ornithologist and will amaze and delight the novice. The authors hope readers' curiosity will be aroused and that their work will satisfy the urge to know. Both authors are birdsmart. Beolens, well known as "the fat birder," runs one of the most widely used websites on the Internet

<www.fatbirder.com> and Watkins has traveled around the globe in pursuit of sightings.

According to Schott's Foreword, *Whose Bird?* "celebrates two eternal forces of human nature: the unquenchable thirst for knowledge, and the insatiable hunger for fame." Its cast of characters includes "heroic adventurers, library-bound boffins, aristocratic patrons, mysterious lovers, fortunate schoolboys, respectable scientists, and caddish charlatans...each of whom has achieved immortality through having a bird named after them." The list of "eponymous" bird names (bird names which include a person) totals 2368, honouring 1124 individual people.

Whose Bird? also provides a heaping measure of good-humoured and amusing reading. In short, it's fun to peruse–a surprising discovery in view of its encyclopedic format; hazy, often blurred photos and myriad dates and numbers–usually dry reading at best. Where else might you find out that Cora's Sheartail was named for a mythological Inca princess of the sun, or that Maria Emilie Snethlage was the first woman scientist to work in Amazonia, or that no fewer than three of those individuals featured were killed by elephants.

The introduction chronicles the book's long and somewhat tortuous, though joyous, birthing. It also tells the reader how to use the book–including a lengthy look at some of the devices used by the authors in accounting for changes in bird names across the centuries, differing conventions used by early ornithologists, creeping errors over time and problems arising out of inconsistencies and idiosyncrasies in nomenclature. Their detailed "instructions" are difficult to follow unless you look at various entries as you read them.

In a chapter titled "How to get a bird named after you," the authors say the best way is to discover a new bird–in the field, in a dusty museum collection, or in the fossil record. This would have been decidedly easier some centuries ago, when many species were "new" and present chances of gaining immortality this way are few. In future, say the authors, we'll doubtless see new naming opportunities through studies of DNA, and, perhaps, the privilege of naming may result from auctions, to be won by the highest bidder.

Amusing "text boxes" scattered throughout treat a variety of commonalities among the over 1000 people for whom birds have been named: females, aristocrats, botanists, charlatans and cheats (who invented, lied and stole to make their names known), X to XXIV (the numbers of birds named for particular individuals, e.g., John Gould - 24; Charles Darwin - 21; P. L. Sclater - 19); watery graves (those who were drowned or shipwrecked); RTAs (road traffic accidents); lost at sea, and many others. Eleven species are named simply for "Mrs" someone.

Individual entries range in length from a couple of phrases to well more than a page—the latter describing Richard Meinertzhagen, a most remarkable collector who was eventually accused of thievery and fraud and branded a kleptomaniac.

A bibliography and an appendix of species listed alphabetically by scientific name complete the volume.

If you've ever been curious about the human source of an eponymous bird name, this book may give you all the answers you want. It's not the kind of tome to be read in one sitting, but rather to keep handy for questions.

Reviewed by Mary Gilliland, 902 University Drive, Saskatoon SK S7N 0K1 E-mail: birdwoman@shaw.ca

CORRIGENDUM

62nd ANNUAL SASKATCHEWAN CHRISTMAS BIRD COUNT TABLE 4

Table 4 Species found in fewer than 9 localities

Species	Locality and Number (* = Count Period)
Gadwall	Qu'Appelle Dam (1)
Northern Pintail	Gardiner Dam (1)
Green-winged Teal	Biggar (1)
Lesser Scaup	Gardiner Dam (6)
Bufflehead	Fort Qu'Appelle (2*), Prince Albert (3)
Hooded Merganser	Qu'Appelle Dam (2)
Common Merganser	Gardiner Dam (147), Prince Albert (1), Saskatoon (3), Squaw Rapids (11)
Red-breasted Merganser	Gardiner Dam (1)
Sharp-shinned Hawk	Indian Head (1)
Cooper's Hawk	Craven (1)
Swainson's Hawk	Indian Head (1)
Red-tailed Hawk	Bromhead (2), Round Lake (1*)
Rough-legged Hawk	Cypress Hills PP (1), Fort Walsh (2), Govenlock (14), Kamsack (1), Last Mountain Lake (1), Qu'Appelle Dam (1), Round Lake (1), Swift Current (1)
American Kestrel	Rouleau (1), Saskatoon (1)
Gyrfalcon	Qu'Appelle Dam (2), Regina (2), Saltcoats (1*), Turtleford (1)
Prairie Falcon	Bangor (1), Gardiner Dam (2), Indian Head (1), Kenaston (1), Weyburn (1*)
Greater Sage-Grouse	Govenlock (1*)
Spruce Grouse	Emma Lake (1*), LaRonge South (3), Love-Torch River (1), Meadow Lake (1), Nipawin (1*), Squaw Rapids (1), Torch River Valley (2), Turtle Lake (1)
Wild Turkey	Broadview (10), Leader North (8)
Sandhill Crane	Yorkton (1)
Common Crane	Leader North (1)
Wilson’s Snipe	Qu'Appelle Dam (1), Regina (1*), Swift Current (1)
Eurasian Collared-Dove	Swift Current (8)
Mourning Dove	Gardiner Dam (1), Love-Torch River (1*)
Western Screech-Owl	Govenlock (1)
Northern Hawk Owl	Clark's Crossing (1), Kelvington (1*), Snowden (1)
Short-eared Owl	Govenlock (1), Luseland (1*), White Bear (1)
Am. Three-toed Woodpecker	Candle Lake (2), LaRonge North (2), Prince Albert NP (4), Sask. R. Forks (3), Squaw Rapids (2)
American Crow	Bethune-Dilke (2*), Craven (1), Regina (11), Saskatoon (4), Stockholm (17), Weyburn (2*), Whitewood(1)
Golden-crowned Kinglet	Biggar (2), Duck Lake (1), Fort Walsh (7), Gardiner Dam (1), Harris (2), Regina (11), Saskatoon (13)
Townsend's Solitaire	Biggar (1), Saskatoon (2), Spinney Hill (1)
Hermit Thrush	Estevan (1)
Varied Thrush	Sask. Landing PP (1)
Northern Mockingbird	Pike Lake (1*)
American Tree Sparrow	Clark's Crossing (1), Indian Head (5), Nipawin (3), Prince Albert (9), Sask. Landing PP (2)
White-throated Sparrow	Kamsack (1), Prince Albert (2), Regina (1), Saskatoon (2), Stockholm (2), Swift Current (1), Turtleford (1), White Bear (1)

Table 4 Species found in fewer than 9 localities

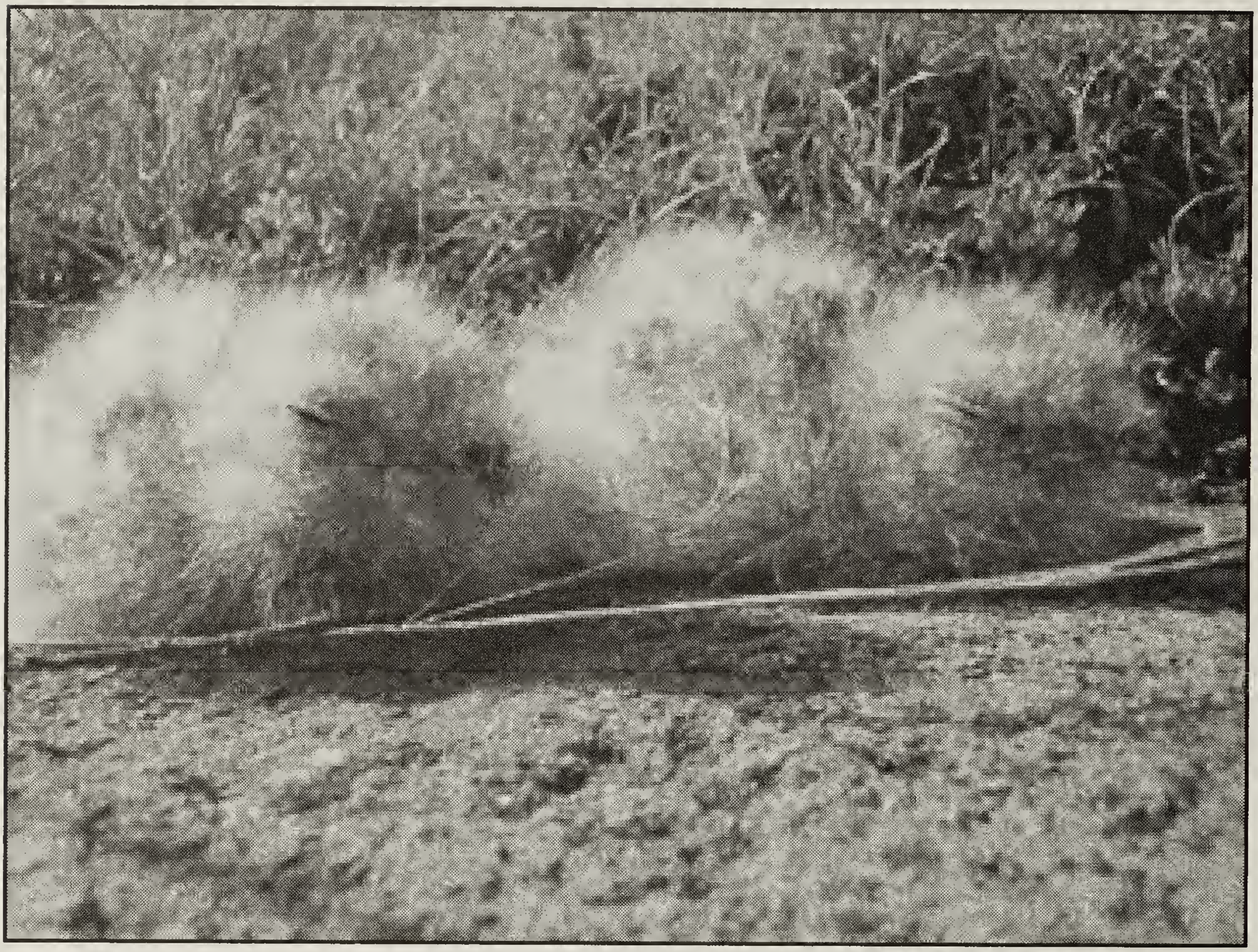
Species	Locality and Number (* = Count Period)
Harris's Sparrow	Broadview (1), Craven (1), Indian Head (1), Sask. Landing PP (2), Sask. R. Forks (1), Swift Current (1), White Bear (1)
White-crowned Sparrow	Pike Lake (1), Preeceville (1), Swift Current (2)
Lapland Longspur	Stockholm (30)
Northern Cardinal	Saskatoon (1*)
Red-winged Blackbird	Fort Walsh (1), Indian Head (5), Regina (1*)
Western Meadowlark	Cypress Hills PP (1), Govenlock (1)
Rusty Blackbird	Fort Walsh (31), Regina (1), Round Lake (1)
Brewer's Blackbird	Beauval (1*), Brightwater Res. (1), Endeavour (1*), Govenlock (3)
Common Grackle	Archerwill (1), Birch Hills (1), Broadview (2), Endeavour (1), Kamsack (1), Kutawagan Lake (1), Regina (3)
Brown-headed Cowbird	Saskatoon (1*)
Purple Finch	Craven (4), Gardiner Dam (1), Good Spirit Lake (2*), Indian Head (21), Kenosee Lake (1), Round Lake (1), Saskatoon (11), Swift Current (21)
Red Crossbill	Armit (5), Fort Walsh (9), Saskatoon (1), Snowden(20), Squaw Rapids (47), Turtleford (9), Turtle Lake (1)
American Goldfinch	Clark's Crossing (1), Craven (3), Fort Qu'Appelle (9), Kenosee Lake (6), Regina(5), Whitewood(2)

Burrowing Owl photographed on the grounds of the Saskatchewan Burrowing Owls Interpretive Centre in Moose Jaw in August 2003. The various color combinations of leg bands aid in identifying individual birds from a distance through binoculars or a spotting scope.

Brian K. Jeffery

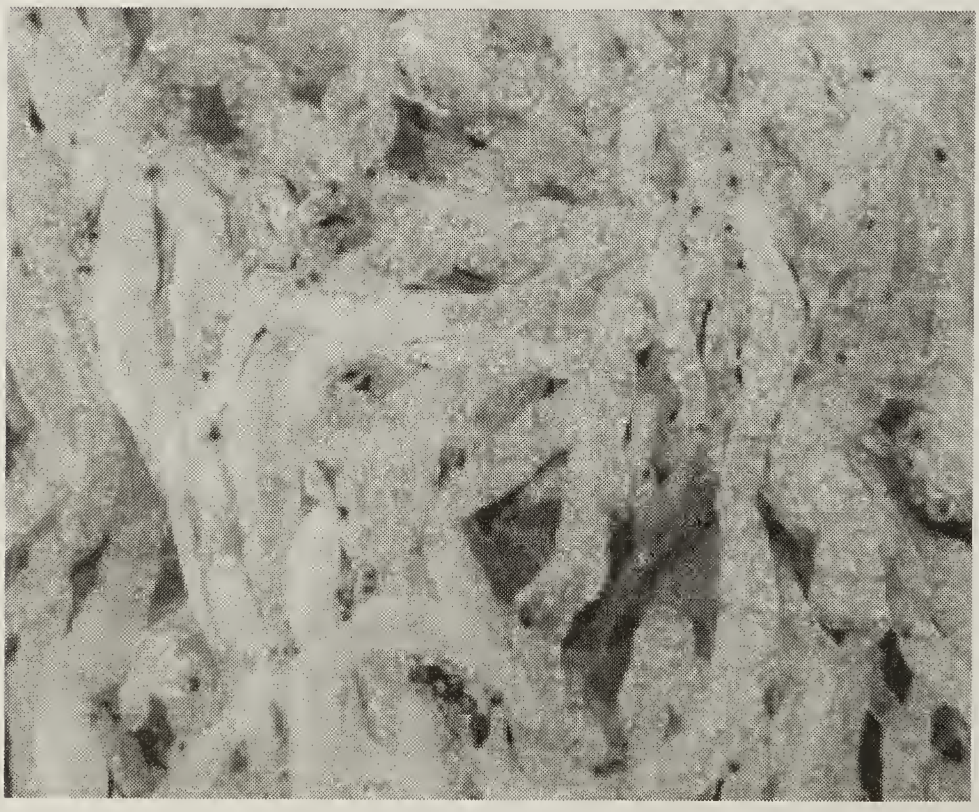
MYSTERY PHOTO

JUNE 2004 MYSTERY PHOTO



These two, fist-sized chicks, were photographed in their natural setting near Weyburn, SK in early July 2003. Can you guess what species of bird these are?

ANSWER TO MARCH MYSTERY PHOTO



The translucent strands are strings of toad eggs which formed large masses in a shallow, prairie slough 12 km east of Liebenthal on June 12, 2003. From a distance, the mass of eggs resembled a mat of algae but a closer look reveals the developing toads inside the translucent strands.

The editors would like to thank Michelle Lanoie for taking the photograph and making it available to *Blue Jay*.

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